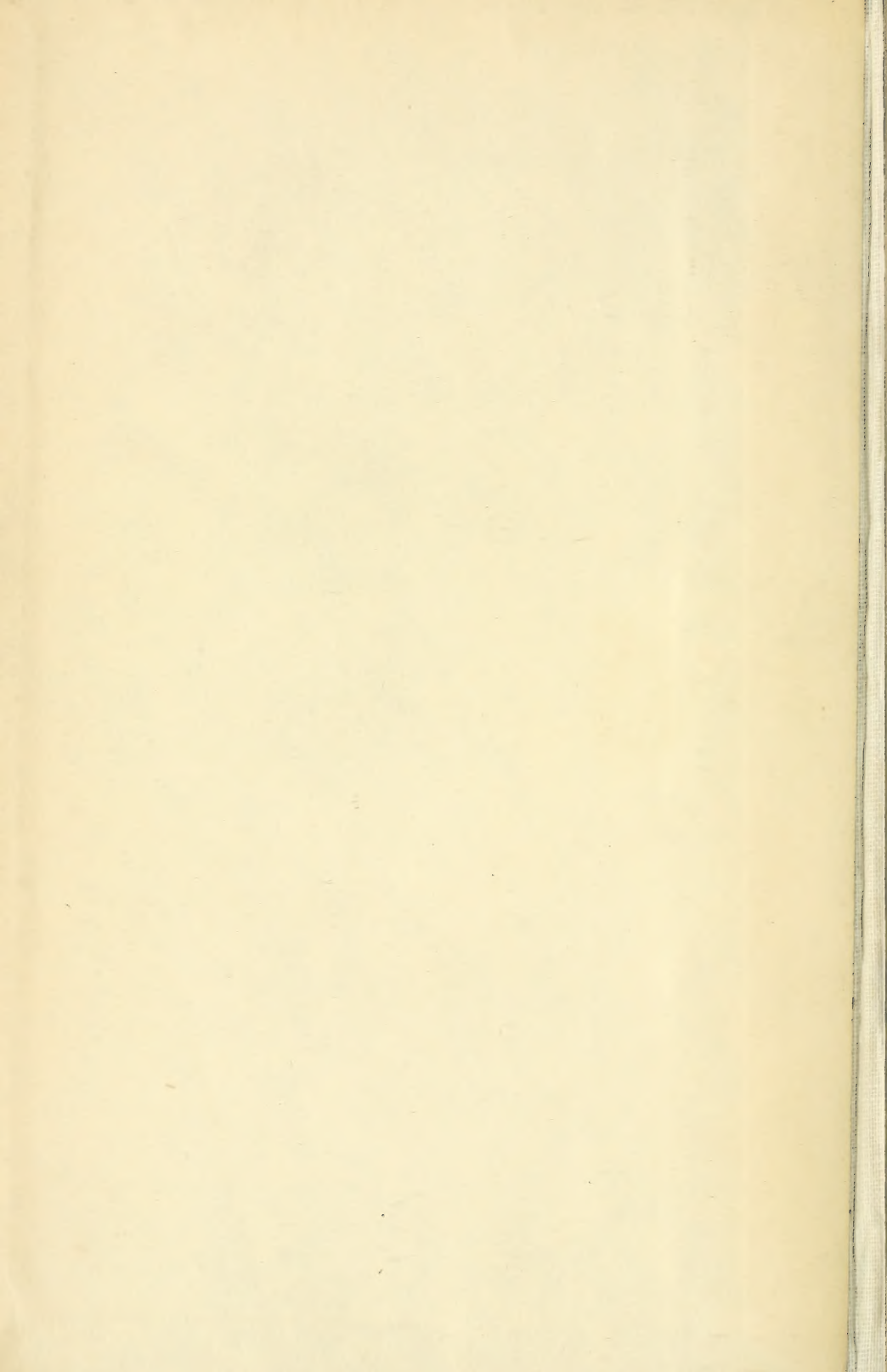


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INDEX OF VOLUME LXXII

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NO. 1

ORIGINAL COMMUNICATIONS

THE EFFECT OF PUBIOTOMY UPON THE COURSE
OF SUBSEQUENT LABORS.*

BY

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My experience with pubiotomy began in 1906 and has continued until the present time. In two reports to the American Gynecological Society in 1908 and 1910, based upon thirteen and twenty-five operations, respectively, I gave my experience with the operation, and stated that in appropriate cases it is both justifiable and conservative. Since then I have employed it in eighteen additional cases; but, as I have learned more about the course of labor in contracted pelvis, I have recognized some of its limitations and have become somewhat more conservative in its use.

As far as I can ascertain the operation has been more extensively practised in my service than in any other American clinic, and I can now report a series of forty-three pubiotomies upon forty women performed by myself and seven assistants without a maternal death. In view of this experience, I still consider it a very satisfactory operation, and I hope that no one will interpret my statement that I have become more conservative in its use as indicating serious dissatisfaction with it, as I expect to continue to employ it under the conditions which I shall elaborate in this report.

Before taking up the consideration of the effect of pubiotomy upon the course of subsequent labors, I shall briefly describe the

* Read before the Buffalo Academy of Medicine, April 21, 1915.

technic which we employ, and the general effect of the operation upon the patients. With one exception, the semi-subcutaneous method of Doederlein has been employed, and the operation has not been resorted to until a prolonged test of the second stage has demonstrated the impossibility of spontaneous delivery, and has been immediately followed by the delivery of the child by forceps or version. Furthermore, the operation has been restricted to patients presenting moderate degrees of contraction, the smallest pelvis having a conjugata vera of 7 cm. (2.8 inches).

I am bound to admit that at least one-half of the cases were complicated by the occurrence of vaginal tears which communicate with the pubiotomy wound. Except for the trouble of sewing them up, they give rise to no complications, and in my opinion are not more serious than ordinary perineal tears. In many instances they heal so satisfactorily that no scar can be felt when the patient is discharged. On the other hand, the bladder was injured in two instances, and was immediately repaired. In one case it healed readily, while in the other it resulted in a minute vesicovaginal fistula, which has required subsequent repair.

The after-care, which is usually described as very onerous to the nurse and painful to the patient, is in reality very simple. Since we have learned that fibrous union between the cut ends of the bone is preferable to bony union, it is not attempted to immobilize the pelvis. Consequently, the dressing consists of a 4-inch strip of adhesive plaster which encircles the pelvis at the level of the trochanters, and the patient is placed upon a Bradford frame for convenience in cleansing until she is able to move spontaneously. Her movements are in no way restricted and she is allowed to turn over in bed and to sit up whenever she desires. She usually turns spontaneously on the second or third day, and sits up in bed during the first days of the second week. Indeed, in the absence of the nurse, several patients have gotten out of bed the night after operation, but have experienced no harm.

As far as the sufferings of the patient are concerned, I can only say that they are not greater than after other major operations, unless the sacroiliac joints have been injured, which can always be prevented if the conjugata vera does not fall below 7 cm., and if the cut ends of the bone are not allowed to gape more than 5 cm. during delivery. The convalescence is somewhat more prolonged than after Cesarean section, but the patient usually begins to walk early in the third week and is discharged one week later.

The ultimate effect upon the locomotion and earning capacity of

the patients is eminently satisfactory. Every one of the women operated upon has returned repeatedly to the clinic for observation, and with one exception each of them has stated that within a few months she could walk and work as well as before. The one exception occurred in a multiparous woman who had suffered from relaxation of the sacroiliac joints before the operation, which naturally persisted after it. I may state, however, that small light women are restored to the *status quo ante* more quickly than large stout women.

With one doubtful exception, healing of the bone wound has been by fibrous union, and subsequent examination has always revealed the existence of motility on passive movement of the leg. When the patients are examined in the upright position with one finger in the vagina and another upon the upper margin of the pubic bone a definite excursion is felt with every step. Such motility, however, does not cause pain, and in no way interferes with locomotion. This was strikingly illustrated in Case IV. The patient in question had been subjected to repeated pubiotomy—first on the left and afterward on the right side—with the result that a movable segment of bone, including the symphysis pubis, was interpolated in the anterior wall of the pelvis. Within two weeks after leaving the hospital, she went to a dance, and since then I have seen her repeatedly and found her as active as a young wild animal.

The effect of pubiotomy upon the size and shape of the pelvis, and upon the course of subsequent labors will now be considered. Twenty of the forty women, upon whom my assistants or myself have performed the operation, have been subsequently delivered in the service, and have had twenty-seven full-term and three premature labors. One of them is now in the hospital awaiting a second labor,* and two other patients, not included in this series, are likewise pregnant.

The study of these thirty labors, whose histories are given in abstract in an appendix, will form the basis for my remarks, and will afford an opportunity of ascertaining not only the effects of pubiotomy upon the course of subsequent labor, but will enable me to discuss the treatment of contracted pelvis in general, and to state my attitude concerning the relative indications for and the merits of the various procedures recommended for its relief.

In this series, the primary pubiotomy was done solely to overcome disproportion resulting from moderate degrees of pelvic con-

* This patient has just been delivered spontaneously.

traction, the smallest pelvis having a conjugata vera of 7 cm. (2.8 inches). The following types of pelvis were represented:

- 8 generally contracted rhachitic pelves
- 5 simple flat pelves
- 2 flat rachitic pelves
- 2 typical funnel pelves
- 2 generally contracted funnel pelves
- 1 generally contracted pelvis

I shall first consider the ultimate effect of the operation upon the pelvis itself and afterward take up its influence upon the course of subsequent labors.

I have already indicated that in all but one patient the section of the pubic bone healed by fibrous union. This resulted in the motility to which reference has already been made, but in many instances it also led to a definite enlargement of the pelvis, which became still further increased in subsequent pregnancies as the result of the hyperemia and softening incident to that condition.

In general, it may be said that the increase occurred less in the conjugata vera than in the transverse diameter of the outlet. Enlargement of the former diameter was noted in six instances, but only in two did it amount to so much as 1 cm. On the other hand, a marked increase in the latter diameter was noted in eleven out of the twenty pelves. This varied from 1 to 3 cm. and averaged 1.8 cm. It is interesting to note that the full increase has not been attained when the patient is discharged after the primary operation, but gradually becomes greater with the lapse of time and reaches its maximum during subsequent labors.

In four instances the pelvis underwent a radical change as the result of the operation. Thus, in Cases VIII, IX and XVIII, a simple flat, a generally contracted funnel and a typical funnel pelvis, respectively, became normal; while in Case I, a generally contracted funnel pelvis became converted into a simple justo-minor one. Furthermore, in two other of our forty patients, who have not as yet become pregnant, the pelvis underwent marked change. These were cases 4707 and 6037. In the first the typical funnel pelvis became normal; while in the second the flat funnel pelvis was converted into a simple flat one. A similar transformation was also observed in one of my private patients, who is now approaching her second confinement. In this instance, pubiotomy was performed after fruitless attempts at forceps delivery in a funnel pelvis presenting a transverse diameter of the outlet of 6.5 cm. Following the operation this increased to 8 cm., and now, six weeks before term, it has still

further increased to 9 cm. so that there is every possibility of a spontaneous outcome. Thus, out of seven radical changes in the size of the pelvis, six occurred in women presenting various types of outlet contraction. Such observations are of the greatest importance, as they forcibly demonstrate the availability of pubiotomy for the relief of dystocia incident to funnel pelvis.

In two other patients (Cases XV and XX) pelvimetry failed to reveal any change in the pelvic measurements, yet at the subsequent labor the beneficial effects of pubiotomy were clearly evident. In these instances the hyperemia incident to pregnancy led to such softening of the fibrous union that, as the head passed through the superior strait, the index-finger could be laid between the cut ends of the pubic bone, which came into apposition again as the head was delivered. The enlargement of the pelvis was purely temporary, as the measurements at the time of discharge were identical with those noted before pubiotomy.

On the other hand, it must be admitted that the contrary sometimes occurs. Ordinarily upon examining patients shortly after pubiotomy, no trace of the bone section can be detected upon the posterior surface of the pubic bone, which is perfectly smooth, while a variable amount of callus may be felt upon its anterior surface. When such patients are examined months or years later, all trace of callus has disappeared, and apart from the motility elicited by passive movement of the thigh, the only sign of the operation consists in a small notch upon the superior and inferior margins of the bone, corresponding to the upper and lower ends of the incision. In one patient, however (Case XIX), an exostosis gradually developed upon the inner surface of the bone, which, at the time of her second labor measured $1 \times 2 \times 4$ cm., and had so shortened the available antero-posterior diameter as to necessitate Cesarean section.

Passing to the study of the subsequent labors, we find that twelve women had one, six women had two, and two women three labors after the initial pubiotomy. Analyzed in another manner, our figures show that ten women had twelve spontaneous labors, while the other ten had eighteen labors, which ended as follows: eleven Cesarean sections, three repeated pubiotomies, one spontaneous full-term, and three premature labors.

A more comprehensive idea of the results is shown by the following data: in eight patients the initial pubiotomy was followed by a single spontaneous labor (Cases I, VI, VII, VIII, IX, XV, XVIII and XX); in two by two spontaneous labors (Cases X

and XI); in three by a single Cesarean section (Cases III, XIII and XVI); in one by a spontaneous labor followed by Cesarean section (Case XII); in two by premature labor followed by Cesarean section (Cases XVII and XIX); in one by three Cesarean sections (Case II); in one by repeated pubiotomy (Case XIV); in one by repeated pubiotomy followed by Cesarean section (Case V); and finally, in one by premature labor, repeated pubiotomy and Cesarean section respectively (Case IV). Four children were lost in the twenty original pubiotomies, but of the thirty subsequent children all but the premature ones were discharged from the hospital with their mothers.

Upon attempting to determine in how far the original pubiotomy was responsible for the outcome in the ten women who had only spontaneous labors afterward, the following data are of importance, and apparently justify the conclusion that in eight women the operation was the predominant factor in bringing about the successful issue. Thus, in Cases VIII, IX and XVIII the contracted pelvis had become normal, while in Cases I and VII it had become appreciably enlarged. In Case XX the softened fibrous union stretched markedly at the time of labor; while the other patients (XI and X) presented a history of two and three operative labors with dead children, respectively, before the pubiotomy and two spontaneous labors apiece following it, although no appreciable increase could be detected in the length of the conjugata vera. Furthermore, it is interesting to note that in Cases I, VII and IX the weight of the child born spontaneously exceeded that of the child delivered by pubiotomy by 980, 900 and 575 grams, respectively.

On the other hand, it appears doubtful whether the operation was in any way responsible for the spontaneous outcome in Cases VI and XV. In the former the pelvic measurements were not changed; while in the latter, although marked stretching of the fibrous union occurred at the time of labor, the child weighed 760 grams less than the one delivered by pubiotomy; and in addition the previous history of the patient showed that a spontaneous outcome was not necessarily impossible, as only three of the five children born prior to the pubiotomy had been delivered by operative means.

In the second series of ten women with eighteen subsequent labors, there is no evidence that any permanent benefit followed pubiotomy. In the first place, none of the pelvis became appreciably larger, and in the second place the histories of the labors show that they were not easier than before the operation; for, leaving the premature births out of consideration, only one of the

fourteen full-term children was born spontaneously, while the rest were delivered by Cesarean section or repeated pubiotomy.

It is generally stated by German writers that pubiotomy is contraindicated in primiparous women except in unusual circumstances on account of the danger of deep communicating vaginal tears and of injury to the bladder. No doubt this is correct unless especial precautions are taken to prevent such complications; but in my experience they need not occur more frequently than in multiparous women, provided the vulva and lower vagina have been dilated manually before beginning the operation. This being the case, it is interesting to inquire whether there was any difference in the incidence of spontaneous labor in the two classes of women.

My figures show that in the twenty patients included in this series, the primary pubiotomy had been done upon eleven primiparæ and nine multiparæ, who had eighteen and twelve subsequent labors respectively. Excluding the premature births, it is found that the primiparæ had four spontaneous and eleven operative labors, as compared with nine and three, respectively, in the multiparæ. As the operative deliveries were exclusively by means of Cesarean section or repeated pubiotomy, it is apparent that such a difference is a serious one, and apparently is entirely in favor of the multiparous woman.

At first glance it appears difficult to reconcile such a discrepancy, but on closer analysis of the histories of our patients it was found that the pelves were actually smaller in the primiparæ. Upon omitting the two examples of typical funnel pelvis, we had to deal with nine primiparous and the same number of multiparous women, and upon calculating the average length of the conjugata vera in each group it is found to be 0.7 cm. shorter in the former. Consequently, admitting the same possibility of enlargement following pubiotomy in the two groups, it is apparent that smaller size of the pelvis would go far toward explaining the lesser frequency of subsequent spontaneous labor in our primiparous patients, in whom the greater contractile power of the uterus and the smaller size of the child calls for a greater degree of conservatism, than in multiparæ presenting a history of previous obstetrical disasters. Taking these considerations into account, it would appear that the differing result is readily explicable, and would not have occurred had we applied the same criteria and indications for interference to the two groups of patients.

Having thus given a summary of the obstetrical history of our twenty patients, I shall now consider the lessons which I have

learned from them, as well as from my more extended experience in the treatment of labor complicated by contracted pelvis.

In the first place, I must confess that in the past somewhat too free use was made of pubiotomy, and that I have materially restricted its employment during recent years; so that I believe that I am now in a position to express an unbiased opinion as to its usefulness and indications. As I look backward, I acknowledge that a number of the earlier cases would have been more conservatively treated had Cesarean section been performed at the onset of labor. In several instances the patients had been under observation during pregnancy, and the disproportion between the head and the pelvis was so great as practically to exclude the possibility of a spontaneous outcome. In them pubiotomy was undertaken primarily for the purpose of testing its field of usefulness. While this was accomplished without loss of maternal life, I believe that it entailed a certain amount of unnecessary suffering; for had Cesarean section been done at the very onset of labor, the patient would have been spared the trials of a long labor and a somewhat longer convalescence. This, however, must be regarded as the premium paid to experience, and was not without value, as it enabled us to establish the usefulness of the operation in certain fields.

Furthermore, I candidly acknowledge that the three repeated pubiotomies were a mistake, and, while they did the patient no appreciable harm, that it would have been more conservative to have ended the second pregnancy by Cesarean section, just as we did in the third in two of the patients.

As is generally known abnormal pelvises may be roughly divided according as the contraction involves the superior or the inferior strait. In my material the first type was observed in 8 per cent. of the white and 35 per cent. of the colored patients; while typical funnel pelvises were noted in from 5 to 6 per cent. of the women of each race.

My experience has taught me that in labor complicated by the latter type of deformity pubiotomy is an ideal operation, and in young women is preferable to any other procedure. In such pelvis knowledge of the size of the transverse diameter of the outlet does not enable us to foretell the degree of dystocia, and even after ascertaining its reciprocal relation with the posterior sagittal diameter a correct prognosis is difficult to establish. Therefore, if labor has come to a standstill with the head arrested at the outlet, I advocate laying the Gigli saw prophylactically before applying forceps. If the head advances after a few moderate tractions, delivery should

be completed in the ordinary way, but if difficulty is encountered the pubic bone should be sawed through, when the gaping of its cut ends will effect such an enlargement of the outlet as will permit an easy forceps delivery. Prophylactic laying of the saw is recommended for the reason that, if the possibility of pubiotomy has not been considered until after it has been demonstrated that delivery by forceps is impossible, it is probable that such powerful traction will have been made as seriously to endanger the life of the child. Furthermore, such a procedure tends toward greater conservatism by preventing the performance of primary pubiotomy solely upon indications furnished by pelvimetry.

In suitable cases of outlet contraction pubiotomy enables us not only to overcome the existing dystocia and to effect the delivery of an uninjured child, but it also increases the probability of spontaneous labor in the future; as we have learned that in a large proportion of cases the distance between the tubera ischii becomes permanently enlarged following the operation, and frequently to such an extent as to convert the pelvis into a normal one. Furthermore, I consider pubiotomy greatly superior to Cesarean section, since no matter how successful the latter may be it only relieves the immediate difficulty, and must be repeated in each subsequent labor. Occasionally, however, in primiparæ toward the end of the reproductive period and in multiparæ with a previous disastrous obstetrical experience, an exception may be made. In them so much importance may attach to the birth of a living child that every precaution must be taken to insure it, and this is best effected by the performance of elective Cesarean section at the onset of labor; but with this exception, I do not think that the two operations are comparable.

As a preface to my remarks concerning the treatment of labor complicated by moderate degrees of contraction at the superior strait, I may say that it is my deliberate conviction that at present many women are unnecessarily subjected to Cesarean section by general surgeons and by obstetricians who are not skilled in the treatment of obstructed labor, and who seem to think that all such cases require radical interference, and who also hold that Cesarean section is practically devoid of danger.

That this is not an exaggeration is shown by the fact that each year I see several spontaneous deliveries in women, who have been subjected to Cesarean section elsewhere, or who have come to me after the operation has been recommended as the only means of delivery. Furthermore, when I read the long lists of operations

which are so frequently published, I cannot but feel that the operation is being abused, and that many women are subjected to it unnecessarily. Do not understand me as condemning the operation, as I have had a large experience with it, and in appropriate cases I consider it as the most conservative procedure. At the same time, I wish to protest against its abuse, as well as against the current view that it is practically devoid of danger. From my own experience, as well as from my reading, I believe that ideal results can be obtained only when the operation is performed at an appointed time at the end of pregnancy, or at the very onset of labor. In such circumstances, its mortality should not exceed that of other uncomplicated laparotomies—say 1 or 2 per cent. On the other hand, even in women in good condition, who have been examined under aseptic precautions, the mortality increases with every hour of labor, and rises to about 10 per cent. when done after several hours of second-stage pains. When performed upon exhausted women, who are already infected, the mortality is still higher, and approaches 25 per cent. Moreover, the mere mortality does not tell the whole story, as many women, who ultimately recover, go through a stormy convalescence.

Accordingly, I believe that the ideal time for conservative Cesarean section is at the onset of labor, while the late operation is too dangerous to be classified as a conservative procedure, except in the presence of an absolute indication. In my experience, only a single patient was lost who had been operated upon early; whereas in late operations the mortality has been so high as to make me unwilling to resort to it unless I am prepared to follow the delivery of the child by supravaginal amputation of the uterus, when the mortality again becomes insignificant. Consequently, I conclude that the involuting uterus is poorly adapted to resist even slight degrees of infection, particularly when associated with a large sutured wound.

After this digression, I return once more to the consideration of the treatment of labor complicated by moderate degrees of inlet contraction—conjugata vera 7.5 cm. and upward. This is greatly facilitated by dividing the patients into several categories, according to the time and condition in which they come into the hands of the obstetrician.

a. Patients under observation during pregnancy or at the onset of labor.

b. Patients admitted late in labor, but who are otherwise in good condition.

c. Patients admitted late in labor, who have already been subjected to attempts at delivery, or who are exhausted or infected.

d. Patients admitted late in labor with child already dead.

In my service 75 to 80 per cent. of all labors complicated by contracted pelvis, of marked, moderate or slight degree, end spontaneously provided Nature is given a fair chance, leaving 20 or 25 per cent. which require operative interference. In approximately one-half of the latter radical interference is necessary; while in the remainder, although Nature has overcome the disproportion, mid or low forceps will be required to replace deficient *vis a tergo*. Accordingly, the ideal to be striven for is so to perfect our means of diagnosis as to be able before the onset of labor to differentiate the patients into those who definitely require Cesarean section, and those in whom labor will end spontaneously.

Unfortunately this is not yet possible, and can be approached only by those who have had considerable experience. At present we are able to measure the pelvis with reasonable accuracy, and to estimate the size of the child's head approximately, but we have no means of determining its degree of malleability, or of foretelling the strength and character of the uterine contractions until the conclusion of labor. Consequently, in many instances, it is only possible to arrive at a reasonable estimation of two of the four factors concerned.

A. This being the case, how are we to treat patients who come into our hands at the end of pregnancy? After accurately measuring the pelvis and estimating the size of the child, most important information is obtained by attempting to impress the head into the pelvis. For this purpose, the brow and occiput are seized through the abdominal walls by a couple of fingers of either hand, and strong pressure is made along the axis of the superior strait. If the head enters readily, we are assured that serious disproportion does not exist and that spontaneous labor may be expected. On the other hand, if the head cannot be so impressed, but its anterior portion impinges upon and markedly overrides the upper margin of the symphysis pubis, we know that such serious disproportion exists that there is no reasonable probability of a spontaneous outcome. In the latter circumstances, I hold that Cesarean section at an appointed time at the end of pregnancy is the most conservative procedure for both mother and child.

Unfortunately, many cases do not fall into either of these categories. In these, although the attempt at impression shows the existence of definite disproportion, there is so moderate a degree of overriding as to make one feel that a couple of hours of moderately

strong second-stage pains will bring about such molding of the head as to insure a favorable ending. Furthermore, the formulation of a correct prognosis is greatly facilitated by the employment of Monro Kerr's combined method of impression, which in doubtful cases should be repeated at weekly intervals. Of course, it goes without saying that in multiparous women the history of the course of previous labors should play an important part in influencing our decision.

In this class of patients, early Cesarean section is indicated if we feel reasonably sure that Nature will not be able to overcome the disproportion; but if we think that she can do so, the patient should be allowed to go into labor and be given a test of several hours in the second stage. Usually our prognostication is fulfilled and the child is born spontaneously, but occasionally the expected engagement and descent fail to occur. What should be done in the latter event? The radical surgeon would reply—conservative Cesarean section, but the trained obstetrician would hesitate, as he knows that the maternal mortality at this time approximates 10 per cent., and rightly considers it too high a price to pay for the child, except in unusual circumstances. I would resort to pubiotomy, as my experience has taught me that its mortality at this time is minimal, and that the chances for the child are excellent, although somewhat less than with Cesarean section, to which is added the possibility that the operation may result in sufficient enlargement of the pelvis to make spontaneous labor possible in the future.

In other words, in the class of cases under consideration, I consider pubiotomy a make-shift operation which has become necessitated and justified by an error in prognosis. In such conditions, it is a most valuable expedient, as it not only affords a means for delivering the child safely, but, what is more important, the knowledge that we have it in reserve enables us to conduct in a conservative manner a large class of cases, and to deliver spontaneously many women who would otherwise have been subjected to Cesarean section.

I hope that I have made my meaning clear, but in order to prevent any misconception, I shall state my position in another way. I do not believe that early Cesarean section and pubiotomy are competitive operations, and I hold that it would be a grave technical error to decide before the onset of labor to perform pubiotomy later; for if we are sure that the disproportion is sufficient to demand radical interference, early conservative Cesarean section is the operation of choice. On the other hand, if the disproportion

appears so moderate that a spontaneous outcome seems highly probable, early section is unjustifiable. In such cases, if the test of labor demonstrates that our expectations have been unfounded, we have to choose between pubiotomy and late Cesarean section with a maternal mortality of 1 or 2 and 10 per cent. respectively.

B. The same argument holds in women who are not seen until late in labor, but who are otherwise in good condition. If the *conjugata vera* measures 7.5 cm. or more, I believe that pubiotomy is the operation of election, if radical interference is necessary. To my mind there can be no discussion as to the choice of operation, as I do not understand how one could defend employing a procedure with a mortality of 10 per cent., when equally good results can be obtained by means of another with five times less mortality.

C. In this group of cases which includes women who are seen late in labor and who have already been subjected to attempts at delivery, or who are exhausted or infected, the problem is much more complicated.

If the patient is already infected, conservative Cesarean section or pubiotomy is equally contraindicated as too dangerous. Consequently, if the child is in good condition, Cesarean section followed by the removal of the uterus becomes the operation of choice and gives surprisingly good results. In a number of my patients the convalescence has been as uneventful as if the operation had been undertaken under ideal conditions. Naturally, if the child is in poor condition, craniotomy should be performed.

The most difficult problems, however, arise when the patient is admitted after previous attempts at delivery, which have usually been made by persons whose technic is questionable, or when she has become profoundly exhausted by a prolonged and fruitless labor. In such cases, conservative Cesarean section is too dangerous to be seriously considered. Accordingly, if the child is in good condition, we face the choice between Cesarean section followed by hysterectomy or pubiotomy. The former is the safer procedure, but inevitably ends the patient's obstetrical career. Consequently, if we feel reasonably sure that the patient is not infected, pubiotomy may be done with satisfactory results, and the child-bearing function preserved. I must confess that in such cases it is frequently very difficult to reach a satisfactory conclusion, and if good results are not obtained one is prone to regret his decision and to wonder if craniotomy would not have been the best procedure. Fortunately, with the spread of obstetrical knowledge such cases are becoming less frequent, and will decline in incidence as time goes on.

D. In patients with moderate degrees of pelvic contraction who are admitted late in labor with the child already dead, the problem is very simple. Here, craniotomy is the only operation indicated and it can be performed without increasing the maternal risk.

Occasionally, in breech and transverse presentations, when it is uncertain whether extraction can be accomplished, I have obtained great comfort from laying the pubiotomy saw prophylactically before attempting extraction, and sawing through the bone if difficulty is encountered. In most instances it has not been necessary to resort to pubiotomy, as extraction has been successfully effected. But the certainty that it is in my power to sever the pubic bone at any moment has given me a sense of confidence which I never before possessed.

You will notice that I have said nothing concerning the induction of premature labor in the class of pelves under discussion. The reason is that I never employ it as the more I learn about the treatment of contracted pelves the less it appeals to me. As I have previously indicated, the ideal is to be conservatively radical, and to attempt to differentiate our patients into those requiring early Cesarean section and those who will have spontaneous labor—in other words, to deliver a living child at full term by artificial or natural means. To my mind, the induction of premature labor means unnecessary operative interference and at best the birth of many handicapped children.

CONCLUSIONS.

I. The article is based upon the study of thirty labors, which occurred subsequently to pubiotomy in twenty individuals. Thirteen full-term and three premature children were born spontaneously.

II. In somewhat more than one-third of our cases, particularly in funnel pelves, pubiotomy has resulted in sufficient enlargement of the pelvis to permit subsequent spontaneous labor.

III. My experience has taught me greater conservatism in the employment of pubiotomy, which should not be regarded as an elective operation, except in funnel pelves in young women.

IV. In contractions of the superior strait, our ideal should be to differentiate the patients into those requiring Cesarean section at the onset of labor, and those in whom a spontaneous outcome may reasonably be expected. Pubiotomy should be employed in the latter only when failure of the head to engage after a prolonged second stage has demonstrated that the prognosis was erroneous.

V. Pubiotomy does not compete with elective Cesarean section at the onset of labor, but is far safer than conservative Cesarean section late in the second stage.

VI. In moderate degrees of contraction of the pelvic inlet, the great field for pubiotomy is in patients who have not been seen until late in labor, or who have been examined by those whose technic is questionable. In such circumstances, conservative Cesarean section is too dangerous, so that the choice lies between pubiotomy, Cesarean section followed by removal of the uterus, or craniotomy upon the living child. If definite infection is present, pubiotomy is contra-indicated.

VII. In version or breech extraction when there is moderate disproportion, prophylactic laying of the Gigli saw adds greatly to the peace of mind of the operator, as it enables him to resort promptly to pubiotomy if unexpected difficulty is encountered.

VIII. The most promising field for pubiotomy is in funnel pelvis in young women, as it not only permits the delivery of a living child, but offers a reasonable prospect of permanently enlarging the pelvis, so that subsequent labors will end spontaneously.

IX. With proper training in the treatment of labor complicated by contracted pelvis, I believe that the induction of premature labor can be definitely abandoned.

ABSTRACT OF HISTORIES.

CASE I.—Pubiotomy in generally contracted funnel pelvis, followed by permanent enlargement of the pelvis and subsequent spontaneous labor.

First Labor, No. 2553.—Hupka. April 13, 1906. Generally contracted funnel pelvis; measurements 23, 26, 30, 18.25, D. C. 10; tubers 7 cm. Left-sided pubiotomy; child in R. S. A. Uninterrupted convalescence, highest temperature 100.5. On discharge no change in the pelvic measurements except for an increase of 1 cm. in the transverse diameter of the outlet.

Child 2660 grams; 49 cm. long; biparietal 9.5 cm.

Second Labor, No. 3601.—September 12, 1908. Spontaneous delivery in L. O. A.; duration of labor eighteen and one-half hours. At this time the diagonal conjugate had increased to 11 cm. and the distance between the tubera ischii to 9 cm. In other words, the pelvis had become converted into a generally contracted one. The convalescence was uneventful. On discharge the uterus was forward, the patient was able to work and walk as well as before operation, but there was definite motility at the site of the bone wound.

Child 3640 grams—980 grams heavier than the first; biparietal 9.75 cm.

CASE II.—Pubiotomy in generally contracted rachitic pelvis, followed by three Cesarean sections.

First Labor, No. 2728.—Anderson, November 27, 1906. Twenty-two-year-old primipara. Pelvic measurements, 22, 22.75, 25 and 15 cm., D. C. 9.75; tubers 10.5 cm. Left-sided pubiotomy L. S. A. Deep communicating vaginal tear; highest temperature was 100.2 on the seventh day. Patient discharged on the twenty-seventh day in excellent condition.

Child 4060 grams; 57 cm. long; biparietal 10.25. It lived for two hours. Autopsy negative.

Second Labor, No. 3894.—May 16, 1909. Pelvic measurements unchanged. Conservative Cesarean section at onset of labor. Uneventful convalescence. Discharged on the twentieth day in excellent condition; no trace of the pubiotomy wound and no motility.

Child 2500 grams; 47 cm. long; biparietal 9.75 cm. Discharged in excellent condition.

Third Labor, No. 5398.—July 23, 1912. Pelvic measurements unchanged. Second Cesarean section at onset of labor. Ideal convalescence. Patient discharged on the nineteenth day in excellent condition. Locomotion normal.

Child 3475 grams; 51 cm. long; biparietal 9.5 cm.

Fourth Labor, No. 7145.—April 9, 1915. Patient admitted late in labor. Third Cesarean section (Porro). Uneventful recovery.

CASE III.—Pubiotomy in generally contracted rachitic pelvis, followed by Cesarean section.

First Labor, No. 2739.—Boston. December 3, 1906. Seventeen years, 0-para. Pelvic measurements 21, 23, 29, 16.5 cm., D. C. 9.5; tubers 12 cm. Child in L. O. A. Left-sided pubiotomy, forceps, 4 cm. separation during delivery, no tear. Convalescence uneventful; highest temperature 102.3 on the seventh day. On discharge on the twenty-sixth day, patient's condition was excellent; uterus forward, locomotion good, definite motility at pubiotomy wound. The diagonal conjugate showed an increase of 0.5 cm. Other measurements as before.

Child 3230 grams; 49 cm. long; biparietal 9.5 cm. Weighed 3500 grams on discharge.

The patient was seen two and one-half years later, when she stated that she could work and walk as well as before. Examination showed definite motility at pubiotomy wound but no change in pelvic measurements.

Second Labor, No. 4116.—November 10, 1909. Conservative Cesarean section at onset of labor. Pelvic measurements unchanged. Patient died on the sixth day from peritonitis. This is the only death which has occurred in the service following elective Cesarean section and was due to an unrecognized defect in sterilization.

Child 3430 grams; 49 cm. long; biparietal 9.75 cm. On discharge it weighed 3640 grams.

CASE IV.—Repeated pubiotomy in generally contracted rachitic pelvis, followed by Porro Cesarean section.

First Labor, No. 2851.—Waters. (Roles.) February 3, 1907. The sixteen-year-old patient stated that she had previously had an abortion and one spontaneous premature labor. Pelvic measure-

ments 23.5, 23.5, 26.5, 14.25 cm., D. C. 8.75; tubera 10 cm. The child was in L. S. A. and it had been planned to do a Cesarean section at the onset of labor. As the patient did not notify the nurse, the membranes ruptured unexpectedly and a foot protruded through the vulva and remained there for some time. As it was felt that the conditions were not ideal for Cesarean section a left-sided pubiotomy was done and the child extracted without difficulty. The patient was discharged on the thirty-sixth day in excellent condition. Uterus forward, locomotion normal; definite motility at pubiotomy wound.

Child 3040 grams; 47 cm. long; biparietal 8.75 cm. It died on the nineteenth day from umbilical infection.

October 25, 1907. Dilatation and curettage for incomplete three months' abortion. At this time the patient stated that she did everything which she could do before the pubiotomy, and that she had gone to a dance a week after her first discharge from the hospital.

Second Labor, No. 3631.—September 18, 1908. The pelvic measurements were unchanged except that the distance between the tubera ischii had increased by 1.25 cm. Right-sided pubiotomy. Child in R. O. P. delivered by version and extraction. Recovery uncomplicated; highest temperature 100.3. Discharged on the twenty-seventh day in excellent condition; uterus forward, locomotion excellent; definite motility at pubiotomy wound.

Child 2110 grams; 45.75 cm. long; biparietal 8.5 cm. Weighed 2370 grams on discharge.

Third Labor, No. 4846.—Out-patient service October 16, 1910. Premature spontaneous birth of a dead child weighing 2040 grams.

Fourth Labor, No. 5146.—November 15, 1911. Pelvic measurements unchanged except that the distance between the tubera ischii was 1.75 cm. greater than on first examination. Child R. Ac. D. A. Cesarean section followed by amputation of the body of the uterus and removal of the left adherent ovary and tube. Recovery uneventful. Discharged on twenty-third day.

Child 2125 grams; 42 cm. long; biparietal 8 cm. The patient has been seen repeatedly since and, although a movable segment of bone is interpolated in the anterior portion of the pelvic ring, locomotion is perfectly normal and she can do anything she pleases.

CASE V.—Repeated pubiotomy followed by conservative Cesarean section.

First Labor, No. 2964.—Strange. April 15, 1907. Generally contracted rachitic pelvis. Measurements 21.75, 23, 27.75 and 16.5 cm., D. C. 9.5; tubers 9 cm. Child R. O. A. Left-sided pubiotomy and forceps. No tear, uncomplicated convalescence, highest temperature 100.2. Discharged on the thirty-second day in excellent condition. Uterus forward, no motility at pubiotomy wound; measurements unchanged except for an increase of 1 cm. in the transverse diameter of the outlet.

Child 2450 grams; 47 cm. long; S. O. B. 9.5, bip. 8.75. Weighed 3070 grams on discharge.

Second Labor, No. 4355.—April 11, 1910. Repeated pubiotomy on right side, forceps. Child in L. O. A., ends of bone gapping 5 cm.

during extraction. Communicating vaginal tear. Convalescence disturbed by breaking down of hematoma in labium majus; highest temperature 102.6 on the eighth day. On discharge on the thirty-second day, uterus forward, definite motility at pubiotomy wound; walks well.

Child 3240 grams; 52 cm. long; S. O. B. 9; biparietal 9 cm. Weighed 3930 grams on discharge.

Patient was seen two years later when she was in excellent condition and stated that she could work and walk as well as before the first operation.

Third Labor, No. 5771.—January 15, 1913. Moderate size child in L. Ac. D. A. Conservative Cesarean section at the onset of labor; excellent recovery; highest temperature 101.6. Discharged in the fifteenth day in excellent condition. Pelvis unchanged.

Child 3030 grams; 47 cm. long; S. O. B. 9.5; biparietal 8.5. Weighed 3130 grams on discharge.

CASE VI.—Pubiotomy preceded and followed by spontaneous labor.

Second Labor, No. 3149.—Bowie. September 10, 1907. The thirty-two-year-old patient had been delivered spontaneously elsewhere. Simple flat pelvis; measurements 25, 26, 30.75 and 16 cm., D. C. 10.5; tubers 9 cm. In labor three days; child in R. O. T., posterior parietal presentation. Left-sided pubiotomy and forceps; no tears. Satisfactory convalescence; highest temperature 100.5. Discharged on the thirty-fourth day with the uterus forward; locomotion excellent; no motility at pubiotomy wound. Child could not be resuscitated. Measurements not recorded.

Third Labor, Out-patient No. 4129.—February 22, 1909. Easy six-hour spontaneous labor in patient's home. Child in L. O. T. Puerperium normal. Pelvic measurements unchanged. No disturbance from pubiotomy.

Child 3400 grams; 49.5 cm. long; S. O. B. 9; bip. 8.5 cm.

CASE VII.—Pubiotomy followed by spontaneous labor.

First Labor, No. 3175.—Slatoff. October 26, 1907. Nineteen-year-old 0-para. Funnel pelvis. Measurements 26.5, 28, 30.5, 19 cm., D. C. not reached; tubera 7 cm. Child in L. O. A., arrested at outlet. Left-sided pubiotomy; easy low forceps, ends of bone separating 4 to 5 cm. No tear; convalescence uncomplicated; highest temperature 101.4. Discharged on the twenty-fourth day; uterus retroverted; locomotion good, definite motility at pubiotomy wound.

Child 3275 grams; 50 cm. long; S. O. B. 9; bip. 9.25 cm. Weighed 3450 grams on discharge.

Second Labor, Out-patient, No. 4343.—September 3, 1909. Easy spontaneous labor in L. O. A. Pelvic measurements as above except that the transverse diameter of the outlet had increased to 8 cm.

Child 3850 grams; 52 cm. long; S. O. B. 9.5; bip. 9.5 cm. Discharged in good condition.

CASE VIII.—Pubiotomy preceded by eight spontaneous and one operative labor and followed by a spontaneous labor. Simple flat converted into a normal pelvis.

Tenth Labor, No. 3780.—Novicki. January 6, 1909. The thirty-two-year-old patient had eight spontaneous labors and one version and extraction before coming into our hands. Two children were born dead. Simple flat pelvis. Measurements 27.75, 29.5, 33.5 and 18 cm., D. C. 10.5; tubera 10.5 cm. Child in R. O. P., no engagement after four hours of second stage. Left-sided pubiotomy followed by version and extraction. No tear. Uninterrupted convalescence, highest temperature 100.6. Discharged on the twenty-fourth day with uterus forward and distinct motility at pubiotomy wound.

Child 2990 grams; 49.5 cm. long; S. O. B. 9.5; bip. 8.75. Weighed 3690 grams on discharge.

Patient was seen one year later when she stated that she works and walks as well as before operation. Slight motility at pubiotomy wound. On the posterior surface a bony ridge $\frac{1}{2}$ cm. thick and 1 cm. wide extends the entire distance length of the bone wound. The diagonal conjugate had increased by 0.75 cm. Other measurements as before.

Eleventh Labor, No. 4664.—December 1, 1910. Pelvis normal. Measurements 28, 29, 32.5, 17.5 cm., D. C. 11.5; tubers 12 cm. Spontaneous labor in R. O. A. The head did not engage until after rupture of the membranes. Normal puerperium.

Child 2735 grams; 48 cm. long; S. O. B. 9.5; bip. 9 cm. Weighed 2595 grams on discharge.

CASE IX.—Pubiotomy followed by spontaneous labor. Funnel pelvis converted into normal.

First Labor, No. 3797.—Adler. January 22, 1909. Thirty-two-year-old o-para. Funnel pelvis. Measurements 24, 28, 32.5, 20.5 cm., D. C. not reached; tubera 7 cm. Child in R. O. T., visible at vulva. Left-sided pubiotomy after unsuccessful attempts at forceps delivery; communicating vaginal tear. Convalescence complicated by breaking down of wound and left femoral phlebitis. Highest temperature 103 on the twenty-sixth day. Discharged in poor condition. Distance between tubera ischii increased to 8.25 cm.

Child 3430 grams; 52 cm. long; S. O. B. 9.25; biparietal 9.5 cm. Weighed 3940 grams on discharge.

One year later patient was in excellent condition; walks as well as ever; definite motility at pubiotomy wound.

Second Labor, No. 4660.—Nov. 27, 1910. Pelvis now normal; measurements 25, 29, 34, 21 cm., D. C. not reached; tubers 10 cm. Easy spontaneous labor in L. O. A., second stage lasting forty minutes. Discharged on fourteenth day in excellent condition.

Child 4140 grams; 53 cm. long; S. O. B. 10; biparietal 9.75 cm. Weighed 4325 grams on discharge.

CASE X.—Pubiotomy preceded by three operative and followed by two spontaneous labors.

Fourth Labor, No. 3897.—Flynn. April 18, 1909. The thirty-two-year-old patient had had three previous operative labors with dead children before coming into our hands. Simple flat pelvis. Measurements 26, 29, 34, 19 cm., D. C. 10.75; tubera 9 cm. Child in

R. O. T. Left-sided pubiotomy, forceps, ends of bone gaping 4 cm. No tear. Convalescence undisturbed. Highest temperature 100. Discharged on twenty-third day with definite motility at pubiotomy wound and with a relaxed sacroiliac joint which had existed before the present pregnancy.

Child 4870 grams; 59 cm. long; S. O. B. 9.5; bip. 9.5 cm. Weighed 5350 grams on discharge.

Patient seen nine months later, still limps, but states that she can walk half a mile without trouble. Pelvis unchanged.

Fifth Labor, No. 5658.—October 22, 1912. Easy spontaneous labor in L. O. A., second stage lasting twenty-five minutes. Puerperium normal. Discharged in good condition. Pelvis as before, except that the distance between the tubera ischii had increased by 1 cm.

Child 3624 grams; 51 cm. long; S. O. B. 9.5; biparietal 9.5 cm. Weighed 3415 grams on discharge.

Sixth Labor, No. 3768.—September 4, 1914. Easy spontaneous twin labor R. O. T. and R. S. T., second stage one hour. Normal puerperium. Discharged on fourteenth day. Uterus forward; definite motility at pubiotomy wound. Walks better than for many years. Pelvis as above, except that the distance between the tubera ischii had increased to 10.5 cm.

First child 3000 grams; 49 cm. long. Second child 2770 grams; 48 cm. long.

CASE XI.—Pubiotomy preceded by two operative labors with dead children and followed by two spontaneous labors.

Third Labor, No. 4092.—Solen. September 7, 1909. Twenty-six years old; generally contracted rachitic pelvis; measurements 24.5, 25.5, 29, 18.5 cm., D. C. 11; tubera 9 cm. A large child lay in L. Ac. D. P. In view of the past history the Gigli saw was placed prophylactically. The child was turned and extraction attempted. Left-sided pubiotomy was done when difficulty was experienced and a live child readily delivered. Communicating vaginal tear. Very satisfactory convalescence, highest temperature 100.4.

On discharge on the twenty-seventh day the patient walked well. There was a small amount of callus on the posterior surface of the pubic bone, and definite motility between its cut ends.

Child 4000 grams; 53.5 cm. long; S. O. B. 9.5; bip. 9.5 cm. Weighed 4240 grams on discharge.

Patient seen six months later when the callus had disappeared while the distance between the tubers had increased by 1 cm. She could work and walk as well as before operation.

Fourth Labor, No. 4950.—July 28, 1911. Spontaneous labor in L. O. T., second stage forty minutes. Pelvic measurements were unchanged except that the distance between the tubera ischii showed an increase of 2 cm. Puerperium normal. Discharged on the fourteenth day in excellent condition. Definite motility at pubiotomy wound. Child 3170 grams; 49 cm. long; S. O. B. 8.75; bip. 8.75 cm. Weighed 3525 grams on discharge.

Fifth Labor, *Out-patient* No. 6329.—October 3, 1914. Spon-

taneous labor in L. O. A., second stage forty minutes. Head did not engage until the membranes ruptured. Puerperium normal. Child 3250 grams; 51 cm. long; S. O. B. 9.5; bip. 9 cm. Weighed 3500 grams on discharge.

CASE XII.—Pubiotomy preceded by one spontaneous labor and followed by one spontaneous labor and a Cesarean section.

Second Labor, No. 4111.—Jackson. September 9, 1909. Twenty-five years old. Before this admission patient had given birth to a 2725-gram child. Generally contracted rachitic pelvis; measurements 23.75, 24, 30, 17.5 cm., D. C. 10.5; tubera 13 cm. Child in R. O. P. Left-sided pubiotomy. Forceps with 3 cm. separation between the cut ends of the bone. No tear. Normal convalescence; highest temperature 100. Discharged on the twenty-sixth day with the uterus forward and definite motility at pubiotomy wound. Walks well and without pain. Child 2860 grams; 50 cm. long; S. O. B. 9.75; bip. 9.5 cm. Weighed 3350 grams on discharge.

Six months later patient stated that she could walk and work as well as ever. Definite motility at pubiotomy wound. No change in pelvic measurements.

Third Labor, No. 5299.—February 29, 1912. Spontaneous labor in R. O. P., second stage lasting two hours, engagement not occurring until late in second stage. Normal puerperium. On discharge patient walked normally, the uterus was forward and there was definite motility at pubiotomy wound. No change in pelvic measurements. Child 2815 grams; 47 cm. long; S. O. B. 9.25 cm.; bip. 8.75 cm. Weighed 2920 grams on discharge.

Fifth Labor, No. 6821.—October 6, 1914. Pelvic measurements unchanged; marked disproportion. Conservative Cesarean section at the onset of labor. Recovery complicated by infection of skin wound. Discharged on the eighteenth day in excellent condition. Child 3400 grams; 50 cm. long; S. O. B. 10; biparietal 9.5 cm. Weighed 3790 grams on discharge.

CASE XIII.—Pubiotomy followed by Cesarean section.

First Labor, No. 4185.—Thanner. Nov. 15, 1909. o-para. Simple flat pelvis. Measurements 25.25, 27, 31.5, 18 cm., D. C. 9.75; tubers 9 cm. Left pubiotomy after a second stage of five hours. Child in L. O. T. with posterior parietal presentation. Communicating vaginal tear; convalescence satisfactory except for tonsillitis on the twelfth day. Discharged on the thirtieth day. Uterus forward; definite motility at pubiotomy wound; locomotion excellent. Pelvis somewhat enlarged, D. C. 10.5; tubers 11.5 cm., an increase of 0.75 and 2.5 cm. respectively. Child 2830 grams; 50 cm. long; head markedly molded; S. O. B. 8.5; biparietal 8.25 cm. Weighed 3530 grams on discharge.

Six months later the patient stated that she could walk and work as well as before operation.

Second Labor, No. 5520.—July 20, 1912. Pelvis same as on discharge examination. On account of marked disproportion, conservative Cesarean section was done at the onset of labor. Uneventful convalescence. Discharged on the eighteenth day in excellent con-

dition. Child 3830 grams; 51 cm. long; S. O. B. 10.25; bip. 10 cm. Weighed 3815 grams on discharge.

CASE XIV.—Pubiotomy preceded by forceps and a dead child; followed by second pubiotomy.

Second Labor, No. 4253.—Wilson. January 13, 1910. Twenty-two years. Had a difficult forceps delivery and a dead child outside. Kypho-scolio rachitic pelvis; measurements 25, 24.5, 29.5, 16 cm., D. C. 10.25; tubers 8.5 cm. Child in L. O. A. Left pubiotomy and forceps after a twenty-five-hour labor, cut ends of the bone separated 3 cm. No tear. Satisfactory convalescence, highest temperature 101.4. Discharged on the twenty-seventh day. Walks well; uterus forward, motility at pubiotomy wound. No change in pelvis. Child 3025 grams; 50 cm. long, S. O. B. 9; biparietal 8.25 cm. Head markedly molded. Weighed 3620 grams on discharge.

Third Labor, No. 5330.—April 5, 1912. Pelvic measurements unchanged. Child in L. O. T. anterior parietal presentation. Failure of engagement after three and one-half hours of strong second-stage pains. Second pubiotomy at site of first, forceps; cut ends of the bone separated 4 cm. Communicating vaginal tear. Slight rent in left side of bladder, which was sutured. Stormy convalescence complicated by pyelitis. Highest temperature 105. Discharged on the twenty-first day with fistula and communicating tear completely healed. Uterus forward; locomotion excellent. No motility at pubiotomy wound. Pelvis unchanged except for an increase of 1.5 cm. in the distance between the tubers. Child 3675 grams; 52 cm. long; S. O. B. 9.5; bip. 8.5. Weighed 3670 grams on discharge.

CASE XV.—Pubiotomy preceded by five labors with three dead children followed by spontaneous labor.*

Sixth Labor, No. 4607.—Carter. October 29, 1910. Twenty-nine years, v-para. Two forceps, one breech extraction and two spontaneous labors—three children born dead. Flat rachitic pelvis; measurements 25.75, 26.75, 29, 17 cm., D. C. 10.5; tubera 10.25 cm. Left-sided pubiotomy and forceps; very difficult extraction, bones separating 6 cm. Communicating vaginal tear. Uninterrupted convalescence; highest temperature 100.4. Discharged on the twenty-eighth day; uterus forward; locomotion good; definite motility at pubiotomy wound. No change in pelvic measurements. Child dead, 3580 grams; 53 cm. long; S. O. B. 10.5; biparietal 9 cm.

Seventh Labor, No. 5462.—June 15, 1912. Easy spontaneous labor in L. O. A. Duration six hours and forty minutes. When head entered the pelvis the finger could be placed between the cut ends of the pubic bone. Normal puerperium. Discharged on thirteenth day. Uterus forward, locomotion excellent; definite motility at pubiotomy wound. No increase in pelvic measurements. Child 2820 grams; 48 cm. long; S. O. B. 10; bip. 8 cm. Head markedly molded. Weighed 2870 grams on discharge.

CASE XVI.—Pubiotomy preceded by forceps and version and extraction, followed by Porro Cesarean.

* Second spontaneous labor after paper was in print.

Third Labor, No. 4608.—Hemming. October 11, 1910. Twenty-nine years old. Simple flat pelvis; measurements 26.75, 27.75, 31.5, D. C. 10.5, tubera 9 cm. First labor was ended by forceps and a dead child outside of the service. Brow presentation; difficult version and extraction. Child, 3050 grams. Left-sided pubiotomy after long second stage. Child in R. O. A. posterior parietal presentation. Difficult forceps. No tear. Normal convalescence, highest temperature 100.6. Discharged on the fifteenth day; uterus forward; locomotion excellent; slight motility at pubiotomy wound. An increase of 0.5 in D. C. and 1.5 cm. in distance between tubera ischii. Child 3260 grams; 53 cm. long; S. O. B. 9.75; biparietal 9 cm. Weighed 3630 grams on discharge.

In September, 1913, a ten weeks' spontaneous complete abortion (out-patient No. 6115).

Fourth Labor, No. 6696.—July 19, 1914. Pelvis smaller than at discharge after first pubiotomy, D. C. being 10; tubera 9.75 cm. The child which presented in L. Ac. D. P. was converted by external manipulations into L. O. T. After three hours of strong second-stage pains the head had not become engaged and was in the posterior parietal position. Accordingly, Cesarean section followed by supravaginal hysterectomy was done, the appendages being left *in situ*. Convalescence normal; discharged on thirtieth day in excellent condition. Child, marked molding of head, promontory impression on right parietal bone; 3200 grams; 49 cm. long; S. O. B. 11.25; bip. 9 cm.

CASE XVII.—Pubiotomy followed by Cesarean section.

First Labor, No. 4858.—Wright. June 9, 1911. Eighteen-year-old para-0. Generally contracted rachitic pelvis; measurements 25.5, 26.5, 31.25, 17 cm., D. C. 10; tubera 10 cm. Left-sided pubiotomy and forceps after a labor of twenty-seven and one-half hours. Child in R. O. T. anterior parietal presentation. Easy extraction during which the cut ends of the bone separated 5 cm. No tear; puerperium complicated by wound infection. Highest temperature 103.8 on the eighth day. Discharged on the twenty-sixth day in good condition; locomotion good; slight motility at pubiotomy wound. At this time there was an increase of 0.5 cm. in the diagonal conjugate and of 1.5 in the distance between the tubera ischii. Child 3330 grams; 52 cm. long. Born dead. Autopsy negative.

Second Labor, No. 5968.—May 13, 1913. Extraction of a premature macerated fetus presenting in L. S. A. Convalescence normal. At this time the increased pelvic measurements noted at the former examination had disappeared.

Third Labor, No. 6753.—August 22, 1914. Pelvic measurements the same as at first observation. Cesarean section on account of large child and definite disproportion. The body of the uterus was amputated on account of the existence of marked aortic insufficiency, which had given rise to broken compensation upon several occasions. Typical recovery. Highest temperature 100.8. Child 3570 grams; 51.5 cm. long; S. O. B. 8.5; biparietal 8.75 cm. Weighed 3865 grams on discharge.

CASE XVIII.—Pubiotomy followed by normal labor. Generally contracted funnel pelvis converted into a normal one.

First Labor, No. 5116.—Brown. November 15, 1911. Twenty-two-year-old o-para. Generally contracted funnel pelvis, 22, 24, 28.5, 17.5 cm., D. C. 11; tubers 8 cm. Forty-hour labor in L. O. A., second stage lasting five hours and twenty minutes. Left-sided pubiotomy and forceps after ineffectual attempts at forceps delivery with the head visible at the outlet. Communicating vaginal tear; highest temperature 102. Gonococci in uterine cultures. Discharged on twenty-second day in good condition. Uterus forward; locomotion good; definite motility at pubiotomy wound. External pelvic measurements as above, D. C. 11.5; tubera 9 cm. In other words, the generally contracted funnel pelvis had become converted into a generally contracted one. Child, 3020 grams; 52 cm. long; S. O. B. 10; bip. 9 cm. Born dead; autopsy negative.

Patient reported three weeks later that she could walk as well as ever and was going to work.

Second Labor, No. 6248.—November 5, 1913. In the two years since the last labor the pelvis had increased definitely in size so that it now falls within the normal category. Measurements, 23, 23.75, 29.5, 17.75 cm., D. C. 11.75; tubera 10 cm. Slight motility at pubiotomy wound. Easy spontaneous labor in R. O. A., second stage lasting twenty-six minutes. Normal puerperium. Discharged in excellent condition on the twelfth day. Child 2715 grams; 47 cm. long; S. O. B. 9.5; bip. 9 cm. Weighed 2970 on discharge.

CASE XIX.—Pubiotomy followed by premature labor and later by Cesarean section.

First Labor, No. 5142.—Johnson. December 18, 1911. Twenty-seven-year-old o-para. Pelvis generally contracted; measurements 21, 23, 28, 16.5 cm., D. C. 10.75; tubers 9.75. Child in L. O. A. Left-sided pubiotomy and forceps after second stage of three and one-half hours. During extraction ends of bone separated 5 cm. Communicating vaginal tear; normal puerperium. Discharged on the twenty-third day in excellent condition, but with a slight limp. Uterus forward; definite motility at pubiotomy wound. Twelve days later the limp had disappeared and she was in excellent condition. Child 2670 grams, 48 cm. long; S. O. B. 9.25; biparietal 9.5 cm. Weighed 3027 grams on discharge.

Second Labor, No. 6156.—August 12, 1913. Pelvic measurements as above except that the distance between the tubera ischii had increased to 10.5 cm. Spontaneous premature delivery in L. O. A. Normal puerperium. Discharged on the twelfth day in excellent condition. Definite motility at pubiotomy wound. Child 2070 grams; 45 cm. long; S. O. B. 9; biparietal 7.75 cm. Weighed 2600 grams on discharge.

Third Labor, No. 6893.—January 3, 1915. Pelvic measurements as above except that the distance between the tubera ischii measured 11 cm.—an increase of 1.25 cm. over the first observation. Marked motility at pubiotomy wound. For obstetrical purposes the pelvis was definitely smaller on account of the existence of an exostosis on

the posterior surface of the left pubic bone, which measured 1 cm. in thickness and 2 cm. in width. On this account a conservative Cesarean section was done at the onset of labor. Puerperium normal. Discharged on the nineteenth day in excellent condition. Child 2650 grams; 47 cm. long; S. O. B. 9.5; biparietal 9 cm. Weighed 2880 grams on discharge.

CASE XX.—Pubiotomy preceded and followed by normal labor.

First Labor, No. 5808.—Salkowitz. January 28, 1913. Twenty-eight-year-old ii-para. Previous labors spontaneous. Simple flat pelvis; measurements 27.5, 30, 31.5, 19.5 cm., D. C. 10.5; tubers 11.5 cm. After a second stage lasting four hours and twenty-five minutes, there was definite disproportion. Child in L. O. T., posterior parietal presentation. As the disproportion did not appear excessive the Gigli saw was placed prophylactically, and after several unsuccessful efforts at traction, a left pubiotomy was done and delivery readily effected. Communicating vaginal tear; highest temperature 100.8. Discharged on the twenty-first day in excellent condition. Uterus forward; locomotion good; definite motility at pubiotomy wound; no change in pelvic measurements. Child 3050 grams; 50 cm. long; head markedly molded; S. O. B. 9.75; biparietal 9 cm. Weighed 3450 grams on discharge.

Second Labor, No. 6744.—August 15, 1914. Pelvic measurements 29, 30, 31, 18.5 cm., D. C. 11.25; tubers 10 cm. Spontaneous labor in L. O. A. when the ends of the pubic bone gaped 1 cm. Head did not engage until second stage, which lasted only ten minutes. Puerperium normal. Discharged on fourteenth day in excellent condition. Child 3100 grams; 49 cm. long; S. O. B. 9.5; biparietal 8.5 cm. Weighed 3120 grams on discharge.

1128 CATHEDRAL STREET.

THE USE OF THE GALVANOCAUTERY KNIFE FOR EXCISION OF MAMMARY TUMORS FOR MICROSCOPIC DIAGNOSIS.*

BY

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THE frequency of cancer of the breast is universally considered to be increasing. Many writers are exhibiting great anxiety over what is designated the positively alarming increase of frequency of this terrible disease. In the language of the mountebank politician they "view with alarm" this great increase in frequency of this awful neoplasm. Nearly all writers on this subject regard cancer as originally a local disease. This view may be pardonably questioned in

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cases such as I have seen in which the disease in an unusually early stage was found in both breasts and apparently in the spinal cord, coincidentally. Amputation of both breasts on the same occasion was done. Symptoms of spinal involvement were noted almost immediately afterward ending in death a few months later. No autopsy was made, however, to positively prove the presence of cancer in the cord. Clinically, she was a victim of that affection. The breast invasions were pronounced by the pathologist as being the earliest he had ever seen and he voluntarily expressed the opinion that the disease had been eradicated by the operation.

I can understand that this disease may be present in several parts of the body coincidentally and each focus be not only independent but essentially local. That the disease may be local for an extremely long period of time is a very comforting fact.

In 1906 I operated on a widow, sixty-seven years of age, for a prodigious ovarian papillomatous cyst, after aspirating 20,000 c.c. of fluid twenty-eight days previously. Being very peculiar, she was allowed the privilege of being largely and constantly cared for by an intelligent spinster daughter and some mystery was apparent about the case. This was solved a few days before the patient left the hospital by the conscience-smitten daughter confiding in me that her mother had had a right breast cancer for thirty years and would like my advice about it if an examination was not a necessity. I succeeded in examining the breast and found an ulcerated tumor about 5 cm. in diameter in the outer lower quadrant of the right breast that included the nipple and was fairly movable.

One enlarged gland was found in the axilla. The ulcer had existed but two months and operation, though advised, was refused. Last year, at the age of seventy-five years, she died of general carcinosis, according to the belief of the attending physician.

A more striking example of the possible long existence of cancer is the case reported by Crevelli⁽³⁾ and Trinca, who, after commenting on recorded cases of chronic scirrhus cancer existing over twelve, fifteen, seventeen, twenty, twenty-three, and thirty-two years, respectively, proceed to relate their observation of a case of chronic scirrhus cancer of the breast in a woman dying in her ninety-fourth year. Her tumor began as a hard nodule near the right nipple at the age of forty-six years, grew slowly for ten years and was never large or prominent until shortly before death. At the age of seventy-three years she became the patient of Crevelli, who treated her during the remaining twenty years of her life. Rapid growth began in January, 1910, and spread to the subscapular region, being the first gland metastasis.

The invasion was first to the axilla and then to the neck and to the mediastinum, causing impossibility of deglutition and death from inanition June 7, 1912. Microscopical examination revealed the older portions consisted of large tracts of degenerated, poorly staining, fibrous tissue and very occasionally a small group of what appeared to be shrunken cancer cells in lymph spaces. The parts recently invaded were much more cellular in character. This was an instance of one form of cancer remaining a local disease for about forty-five years, which is very strong evidence of the local nature, primarily, of cancer, at least when located in the breast. All realize then, that, in the abstract, early recognition and prompt treatment of cancer of the breast is the only logical plan. Unfortunately, such treatment is often impossible as a result of delay in consultation of surgeon or family physician by the patient and even delayed action by the latter two. I believe all of us are prone to delay operations, in breast tumors particularly if the patient be young or the tumor very small in size and with no characteristics of cancer. Very many times have I counselled nonoperative treatment for such tumors, particularly when both breasts were affected and the patient young and more especially if unmarried. In some of these instances I have been severely criticised by parents who, in the meantime, had accepted the advice of surgeons to have these tumors and even the breasts removed.

In no case of this quite large group has a postoperative diagnosis (either clinical or microscopical) of cancer been made. And yet I confess to a change in conviction as to the advisability of removal of nearly all of these tumors. This change has been brought about by four influences, viz.; first, repeatedly proving clinically and microscopically in my work that a very fine nodule removed within a few hours after discovery by the patient has been found to be cancer; second, the conclusion that all breast tumors are dangerous because a very large percentage of them are malignant or will so become later; third, the facility by the operation of J. Collins Warren⁽¹³⁾ of removal of breast tumors without disfiguring; and, fourth, the special facility of removal of tumors of doubtful nature for prompt microscopical examination by the method I have employed and recommended and without breast deformity.

A neurotic and very spare spinster of forty-four years who had been in close attendance upon her mother during a protracted illness from cancer of the uterus and vagina that terminated fatally two months before, was seized with a sharp and severe, though fleeting, pain in the right breast while preparing to retire the night of Satur-

day, March 9, 1907. Putting her hand to the affected place she was astounded to find a lump, though very small.

In alarm the following morning I was called and found a hard lump in the upper outer quadrant of the right breast that from size, shape and consistency resembled an ordinary field pea. It was about 2 inches from the nipple and might easily have been considered an enlarged lymphatic gland. The breast was quite small and thin.

The following morning (Monday), I performed a very wide operation for eradication. An enlargement was found near the borders of the pectoral muscles. Microscopic—very early cancer of breast and axillary nodule. On the night of Saturday, August 8, 1908, the experience of the Saturday, March 9, 1907 was repeated as well as my being called next morning and doing a wide operation a day later and the microscopical report. She died of cancer of the spinal cord in June, 1909. This case is mentioned to illustrate the early detection and early removal of small breast nodules that prove microscopically to be malignant.

I shall not discuss the diagnosis, either clinically or microscopically, of cancer of the breast nor further whether early (young) tumors should always, or usually, be removed promptly. I will call attention to Warren's operation (already mentioned) which is a modification of that of T. Gaillard Thomas.⁽¹²⁾ The Warren operation referred to involves making an incision along the outer and lower border of the breast, separation of the whole or a portion of the posterior side of the gland from adjacent tissues, exploration or removal of a tumor or tumors of the breast thought to be benign and proper closure of the wound.

That any tumor of the breast furnishes an indication for amputation (removal) of that organ certainly cannot be maintained.

That early malignant tumor does furnish a peremptory indication for radical operation is beyond peradventure. Between these classes lie many breast tumors that are in the twilight zone of malignancy. Aside from the all-important conscientious treatment of the breast tumor there remains as a constant factor the features of diagnosis and treatment based upon it. One naturally avoids humiliation born of improper treatment based upon a failure to properly diagnose a breast tumor.

RESECTIONS AND OPERATIONS OTHER THAN RADICAL.

The advisability and dangers of such procedures have received marked attention during the past ten years. Until greater confi-

dence is created in the surgical world in the Abderhalden and other serum tests for cancer resort to such surgical procedures to procure specimens of tissue for microscopical diagnosis will have to be made. This is well recognized by MacCarty,(6) Richardson,(8) Rodman,(10) Bloodgood, Ryall,(11) and others who express positive affirmations on the necessity of such microscopical work and procuring tissue for it. Rodman says that 10 to 25 per cent. of cases of abnormal involution of the breast end in cancer and that the diagnosis can be made only from the microscopical appearances. He also says(10) "I wish to state positively my conviction that no one, however skilled, experienced, or careful he may be in his examination or in eliciting the history of the case, can safely determine the nature of a lesion before operation in more than 75 per cent. of his cases, in the remaining 25 per cent. *at least* either diagnostic incision or the use of frozen sections will be necessary."

W. J. Mayo,(7) says "Removal of pieces of the tumor for microscopical examination must be cautiously done and if possible, immediate extirpation of the growth should be made if the frozen sections show malignancy."

We are well aware that at times clinical evidence may conflict with microscopical findings and be the more reliable. This is specially emphasized in the rapid frozen section work done during operations when many sections fail to reveal malignant changes which nevertheless may exist in unexamined portions of the tissue removed for the purpose. This feature lessens the reliability of such work but by no means discredits it and it remains an important element of the *armamentarium chirurgicum* for the treatment of such growths. Having shown the necessity for such methods of securing specimens for microscopical diagnosis we must call attention to the grave dangers encountered in this feature of the procedure. Mayo (*loc. cit.*) says, "If a suspicious tumor in the breast be localized it is wise to remove the entire tumor for examination without cutting into it and then, if necessary, do a radical operation at once. If removal of the specimen cannot be followed by immediate extirpation the wound in the growth should be sealed by use of the actual cautery or pure phenol."

The dangers encountered in securing specimens for microscopic examination are thus seen to be contamination of uninvolved structures by the cancerous tissue and by undue irritation stimulating an increased lymphatic absorption. Ryall (*loc. cit.*) mentions finding cancer cells under the finger nails of those engaged in an operation for cancer. He sews up resection wounds, made for securing specimens,

with *en masse* sutures and then proceeds with the radical operation as if no resections were made to procure tissue for diagnosis.

Greenough(4) and Simmons state "In our experience exploratory removal of a nodule, suspected of being carcinoma, from the breast by local excision is a very dangerous procedure. We do not do this ourselves, but we have had a number of cases referred to us where such a local excision has been done by another surgeon, and we found that recurrence was almost inevitable, even when the local excision has been followed almost immediately by the most extensive and complete operation for cancer." Horsley,(5) Babler(1) and Handley have written on this subject, in the same view.

PREVENTION OF CONTAMINATION.

Recognizing the danger of contamination during resection and of lymphatic stimulation incident to such manipulations various plans of obviating these dangers have been employed. Rodman(9) says in reference to securing frozen sections in cases of doubt, "There is no danger in such a practice if a hot iron is used at the time, even if the case is cancerous." Babler employed Harrington's antiseptic solution from one-half to one minute in the resection wound. Formaldehyde has been employed similarly.

GALVANOCAUTERIZATION.

Shortly after installing the Downes' Electrothermic angiotribe in 1903, I began experimentation with it in the treatment of the uterus and of the breast. For galvanocauterization of the advanced cervical cancer I devised a cooling vaginal speculum that has proven very efficient and in breast tumors localized and only suspicious of malignancy I applied the galvanocautery for exsection of the growths or removal of portions of doubtful tumors for microscopical examination.

In this work carried out in many cases I have found but one objection to it, when properly used. That consisted of the slowness of the cautery knife when the breasts have been large. This led me to change the technic somewhat. To economize in time I have adopted the plan of cutting the tissues for a short distance with a sharp knife and with the flat sides of the cautery knife immediately sealing to a considerable depth the sides and bottom of the wound. The use of the knife is again resumed to be promptly followed by the cautery as before. This process is continued until the tissue

desired is entirely removed, leaving behind a crater with charred boundaries. The hot oil that is fried from the tissues during this procedure is taken up promptly with small pledgets of cotton or gauze in the grasp of forceps and at once discarded. The wound is now covered carefully and the report of the microscopical investigation awaited. If the tissue is reported to be malignant a radical operation is at once performed. If it is reported to be benign the surgeon may yet decide, from a consideration of the clinical evidence, to perform a radical operation.

If the operation is not to be extended, the wound margins are trimmed of all cooked tissue and proximal portions of severed milk ducts and the wound closed completely with sutures. The J. Collins Warren operation I have performed entirely with the knife and cautery as above mentioned with satisfactory results. One will be surprised by the facility with which he can perform a breast resection by this plan, after a little practice.

In a meeting of The Washington Obstetrical and Gynecological Society,(2) March 19, 1911, and in discussion of Dr. Abbe's paper, "Treatment of Breast Cancer," the following appears; "Dr. Bovée recommends the exsection of the growth by the galvanocautery to avoid any contamination of the operating field and to seal all lymphatic channels so as to avoid further extension from the tumor exsection. Then the mass removed could be examined by the pathologist and the operation completed as indicated. If the mass was benign the cauterized scar was excised and the wound closed, but if the mass was malignant then the radical removal of the breast glands and muscles was indicated."

Having had several years of experience with the method, thus demonstrating its advantages. I have presumed upon the time of the society to call it to your attention, hoping others may find it as valuable as a routine procedure as it has seemed to be to me.

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SWEAT-GLAND TUMORS OF THE VULVA (ADENOMA HIDRADENOIDES VULVÆ).*

BY

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(With seven illustrations.)

WITH the exception of carcinoma, and Bartholin-gland cysts, tumors of the vulva are of comparatively infrequent occurrence; occasional cases of fibroma, angioma, and sarcoma, and a number of lipomas have been described, but on the whole not a great deal is to be found in the literature on the subject of vulvar growths other than cancer. In addition to the types of neoplasm just mentioned, however, a few cases have been reported of small, more or less cystic growths occurring generally in the labia majora, the recognition of whose true significance dates from a paper published in 1904 by Pick, of Berlin, in which he reported two cases of vulvar tumors which he considered to arise from *sweat glands*, his reasons for this belief being, very briefly, as follows:

The growths,† which were situated chiefly in the thickness of the corium, presented a complicated adenomatous or papillary structure, consisting of innumerable irregular acini and tubules, separated by exceedingly delicate connective-tissue septa. The acini were seen to be lined in many places by a *double layer* of cells, consisting of an inner row of tall cylindrical cells, and an outer row of much lower, somewhat more irregularly shaped cells. Outside of the latter there was seen in many instances a well-developed layer of *elastic tissue*. In places the superficial squamous epithelium covering the labium appeared to send down long prolongations, these communicating with the tumor acini. Pick laid great stress on the importance of the double-layered character of the epithelium,

* Presented before the Pathological Society of Philadelphia, May 13, 1915.

† A more detailed resumé of the structural characteristics of these tumors will be found at the end of the paper.

and the presence of the large amount of elastic tissue throughout the tumors, both these conditions being found in the structure of the normal sweat gland. As is well known, the secreting portion of the latter is lined by a layer of tall cylindrical cells, presenting toward the lumen a very sharp free edge or "cuticle" (Rabl); external to these there is usually seen an irregular layer of much smaller units, representing involuntary muscle cells which lie at right angles to the first cells, running practically parallel or slightly spiral to the long axis of the sweat-gland tubule. Outside of these there is always found in normal sweat glands a delicate membrana propria elastica. These characteristics, then, taken in conjunction with the demonstrable communication of the tumor with the external surface, are amply sufficient, in Pick's estimation, to justify the diagnosis of an adenoma of sweat-gland origin. He says that he is even willing to make this diagnosis without any demonstrable communication between the tumor and the epidermis, and goes so far as to assign to this group a small growth previously reported by Schickele as a "mesonephric tumor."

Since the publication of Pick's article, a number of other pathologists have reported similar cases, and although as yet the list comprises hardly a dozen examples, this type of vulvar growth has come to be recognized as a fairly well-established entity. Since these little tumors present at first sight a rather confusing histologic picture, especially from the standpoint of possible malignancy indeed, one showed a distinct tendency to recur, and one other has been reported as definitely malignant—a somewhat further study of them appears not without value. It has recently been my fortune to come across a vulvar tumor which corresponds very closely to the ones described by Pick, the salient features of this case being as follows:

Clinical History.—The patient was an unmarried woman, thirty-nine years of age, who had had for many years a small, freely movable, painless tumor in the extreme anterior portion of the right labium majus, just to the right of the clitoris. The little growth had recently become slightly ulcerated, but had not shown any increase in size.

Operation.—(Dr. John G. Clark). The little vulvar growth, which was diagnosed clinically as a "papilloma" or "lipoma," was removed by means of the cautery.

Specimen.—This consists of an oval bit of tissue measuring $3 \times 1.75 \times 1.5$ cm. One surface is covered by skin containing a few hairs; in the central portion of this surface there is a small area of ulceration, over which the skin is lacking. On section through the center of the specimen it is seen to be made up chiefly of a nodule

of yellowish-white, fairly firm tissue, with a slight amount of softening in the center.

Microscopically.—A cross-section through the entire specimen shows the following characteristics (Fig. 1): The surface *ABCD* is covered by epidermis in the particular section from which this

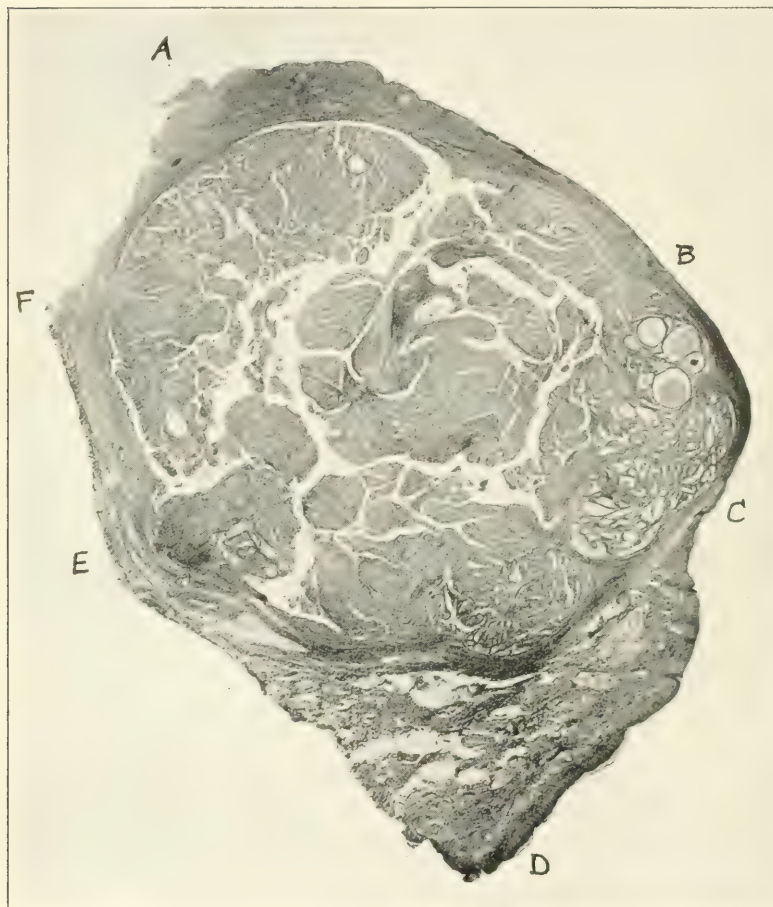


FIG. 1.—Low power photograph of a section through the entire tumor and surrounding tissue.

photograph was made, and which was taken beyond the area of ulceration mentioned above. The epidermis, although everywhere intact, becomes decidedly thinned out in the portion *BC*; in sections taken through the central (ulcerated) portion of the specimen, however, the epidermis is entirely lacking in this region, and the tumor tissue is directly exposed. In the sections showing

intact epidermis, the tumor is everywhere separated from it by a narrow zone of fibrous tissue. The edge *FED* represents the cut surface, and shows the effect of cauterization. (From *A* to *F* there is a slight tissue defect—this portion was probably likewise covered by squamous epithelium.)

The tumor itself, about 1 cm. in diameter, lies almost entirely within the thickened corium of the skin, reaching slightly into the subcutaneous tissue in its deepest portion. It consists primarily of

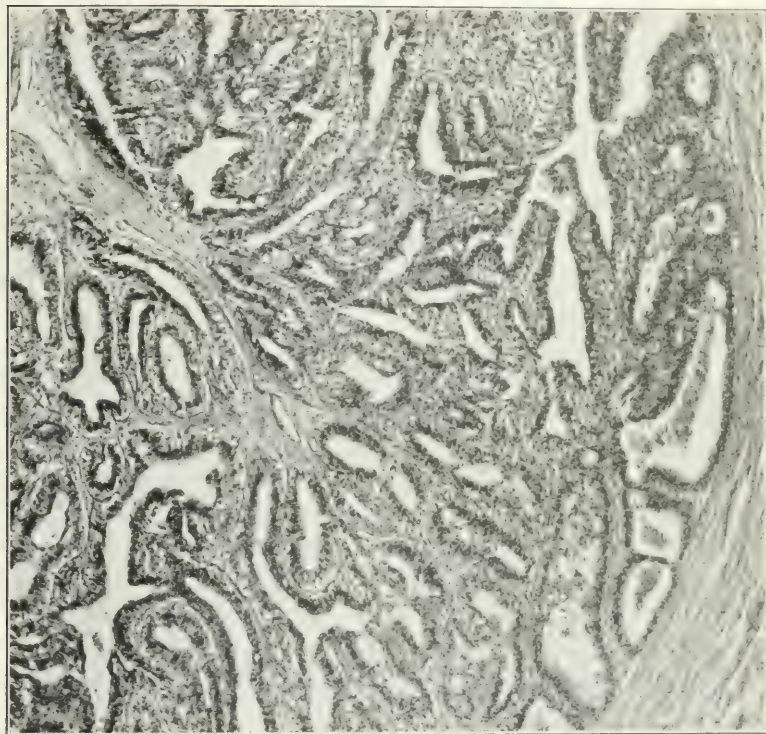


FIG. 2.—Medium power photograph of a portion of the periphery of the tumor, showing adenomatous character; at the right is the surrounding fibrous tissue of the corium.

innumerable irregular acini and papillæ, the acinar characteristic being more marked in the peripheral portions (Fig. 2), the papillary in the central (Fig. 3). In one portion the tumor tissue is separated from the surrounding corium by a narrow epithelium-lined cleft, suggesting the formation of the papillary masses in a cystic cavity, but for the most part the tumor acini are in direct contact with the surrounding fibrous corium, as shown in Fig. 2. The individual acini are separated, for the most part, by exceedingly delicate connective-tissue septa, though in places these are somewhat

thicker, and carry small blood-vessels (one of these is well shown in Fig. 2). In one area (in the neighborhood of *BC*, Fig. 1) there are a number of distinctly cystic acini, filled with granular, poorly staining material (Fig. 4). Under the high power, many of the acini are seen to have a distinctly double layer of epithelium, consisting of an inner row of sharply defined, tall columnar cells with central nuclei, and an outer row of somewhat less distinct, irregularly oval or cuboidal cells (Fig. 5), but in other areas the double-layered character of the epithelium is not so apparent, merely the tall columnar cells being distinguishable. In suitably stained specimens a very rich network of elastic fibers can be seen running in the connective-

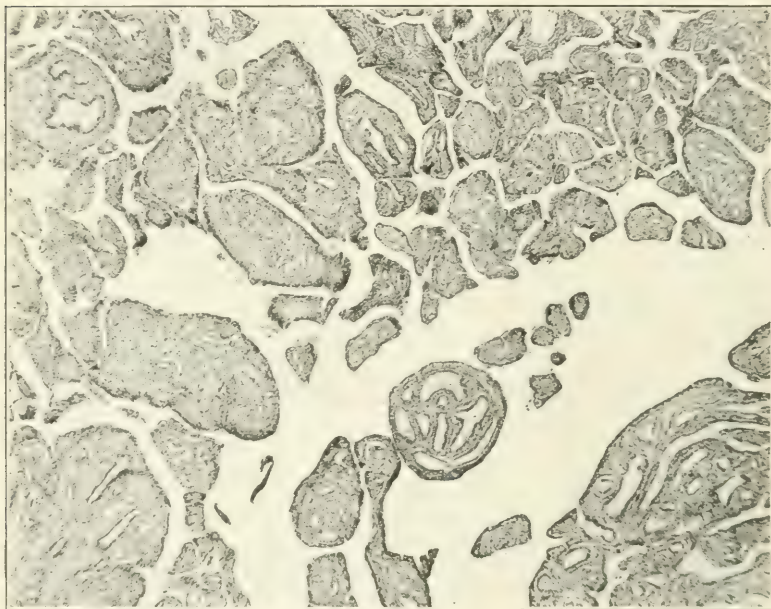


FIG. 3.—Somewhat lower power view from the central portion of the tumor, showing more papillary structure.

tissue septa between the individual acini throughout all portions of the tumor (Fig. 6).

For the most part, the tumor proper is sharply defined from the surrounding tissue of the corium, as is shown in Figs. 2 and 4, but at one point this demarcation is somewhat less distinct (Fig. 7), a few acini here showing a tendency to push out beyond the general contour of the growth into the corium, and even into the subcutaneous tissue; at this point there is also quite a marked proliferation of the tumor cells through the stroma tissue.

To sum up, we have here a small, soft growth, about 1 cm. in diameter, of long standing, occurring in the anterior portion of the

labium majus, practically limited to the corium, and presenting in some areas a richly adenomatous, in others a more papillary type of growth, the former distinctly predominating, however. The whole presents at first glance a histologic appearance strongly suggestive of an actively proliferating papillary cyst adenoma of the breast. On close examination, the individual acini are seen to

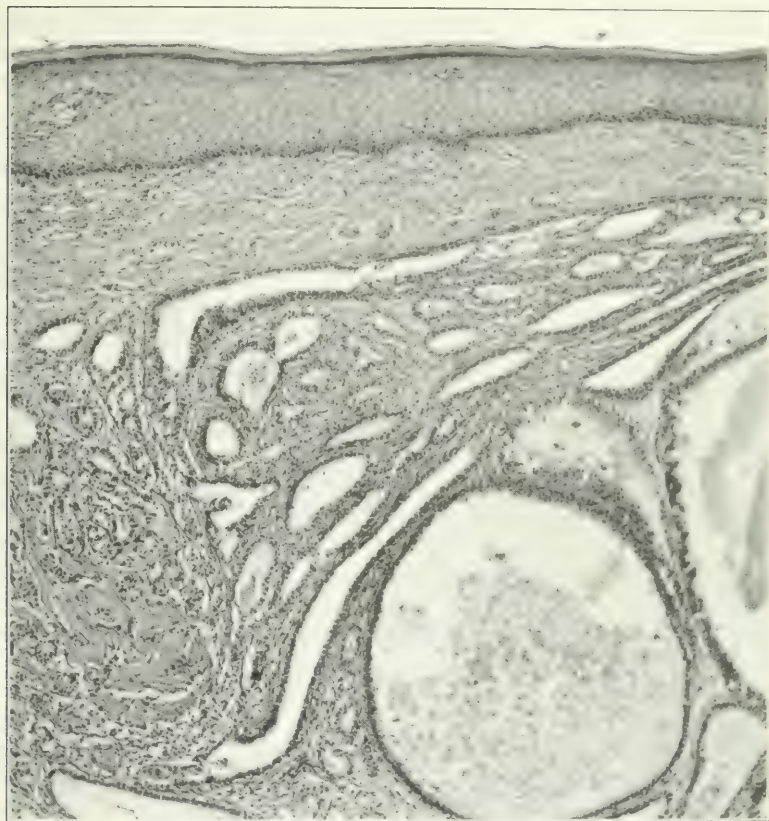


FIG. 4.—Portion of the edge of the tumor (region of B, Fig. 1.), showing cystic acini and squamous epithelium of the epidermis.

present in many instances a double-layered epithelial lining, and to be separated by very delicate connective-tissue trabeculae containing numerous elastic fibers. The structure of this growth corresponds very closely with those described by Pick, except that no definite communication with the epidermis can be demonstrated. It must be remembered, however, that in the central

portion of the tumor, where such communication, if present at all, would be most likely to be found, the skin is lacking over a considerable area as a result of ulceration, so that had any such communication existed, it would inevitably have disappeared.

The corium surrounding the tumor contains several hair follicles, with a number of sebaceous glands and a few groups of large, apparently actively secreting sweat glands, which latter show, however, no demonstrable relation to the tumor.

About the only sources of origin that could come into serious

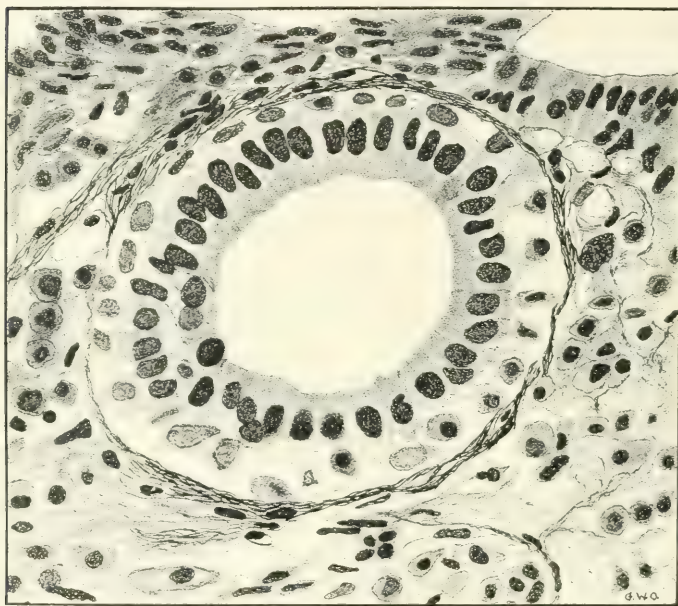


FIG. 5.—High power drawing of a single acinus, showing double layered character of the epithelium (drawn from a section stained with Van Gieson).

consideration for the growth under discussion, other than the sweat glands, would be (1) Bartholin's gland, (2) small mucous glands sometimes found in the labia, or (3) remains of embryonic structures, such as the Wolffian duct. The situation of the tumor near the clitoris is of itself sufficient practically to exclude the first of these possibilities; moreover, the structure is very different from that which we would expect to find in a tumor arising from the mucus-producing cells of Bartholin's or other small mucous skin glands. With regard to a possible origin from embryonic (Wolffian) remains, this is always a difficult matter definitely to prove or dis-

prove, but it would seem to be going rather far afield for an explanation which can be found much more easily near at hand to pass over the sweat-gland origin in favor of the Wolffian; here again, the structural peculiarities of the tumor, particularly the rich supply of elastic tissue, are difficulties in the way of the latter, but are all in favor of the former theory. We know that sweat glands occur in fairly large numbers, and of particularly large size, in the labia majora; while they are not usually believed to occur in the labia minora, they have been occasionally demonstrated there also,



FIG. 6. Photograph from a section stained with orcein-methylene blue, showing rich elastic tissue network between the acini.

a matter of some importance, in view of the fact that one of the cases cited below involved the latter structure.

All the tumors of this group so far reported have been considered benign with the exception of one described by Ruge, who thought he saw in his slides distinct evidences of malignant change. The case reported in the present paper I considered at first distinctly suspicious, but after more careful study of it I am convinced that it is entirely benign. The structure is regular throughout—there is no tendency for the epithelial elements to break through the basement membrane, nor to become heaped up into multiple layers; the

individual cells are regular in type, and show no definite polymorphism. At only the one area shown in Fig. 7 do the acini show any

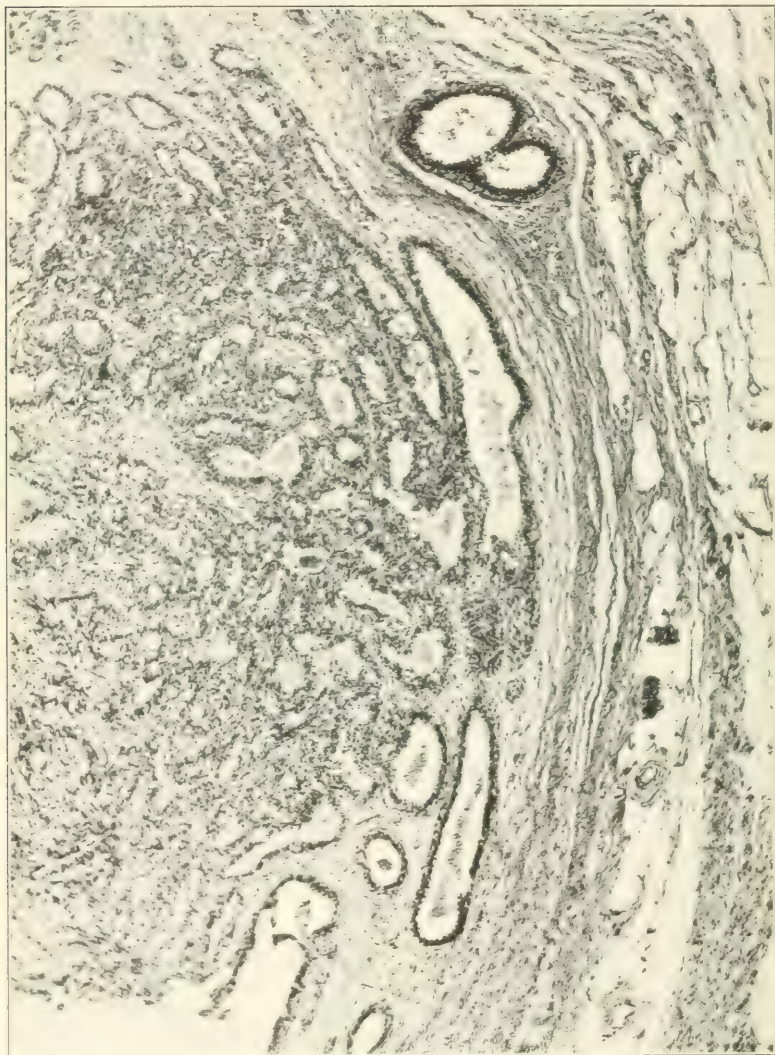


Fig. 7.—Portion of the tumor periphery, showing some advancement of the acini into the surrounding tissue, and considerable proliferation of the tumor cells,

tendency to extend into the surrounding tissue, and here this tendency is hardly as yet sufficient to warrant a diagnosis of beginning malignancy, even in conjunction with the slight amount of

active proliferation of the cells in this region. Such appearances are common to many adenomata.* That such a tumor, subjected from its exposed position to numerous minor traumata, might well in time become malignant, however, seems highly probable.

With regard to the nomenclature of these tumors, Pick drew a distinction between growths which can be demonstrated to have arisen from fully formed sweat glands, and those which, though possessing indisputable sweat-gland structure, cannot be brought into definite relation with such glands, but which appear to arise from the epidermis, or at least from incompletely formed sweat glands.† To the former he applied the term "hidradenoma," to the latter "adenoma hidradenoides." While I agree with Landsteiner that this distinction is rather far-fetched, and only tends to complicate matters, the single term "hidradenoma" being apparently sufficient for all practical purposes, I have accepted Pick's terminology, as it seems to have been pretty definitely adopted, at least in the German literature. Apparently none of the little vulvar growths have been brought into definite relation with fully differentiated sweat glands, and hence the designation "hidradenoma" is not, according to Pick's definition, applicable to them.

As comparatively little has appeared in the English or American literature on the subject of these tumors, I append here a condensed resumé of the most important features of the few cases that I have been able to collect which appear to fall in the group of sweat-gland adenomas of the vulva.

1. Braun (1892), long before the appearance of Pick's paper, in an article devoted to the discussion of skin epitheliomas, refers to the following case: "I possess," he says, "microscopic preparations of a subcutaneous, circumscribed neoplasm, the size of a hazelnut, of which I know only that it comes from the labium majus of an elderly woman. It consists of tortuous gland tubules and cysts, lined with cylindrical cells, with papillary projections into the lumen. . . . The character of the neoplasm is that of an adenoma, . . . and leading from the cysts to the external surface through the cutis and superficial epithelium are numerous excretory ducts. This is certainly a true sweat-gland adenoma." Although Braun evidently appreciated the true character of his specimen, this brief mention of it attracted little attention, and apparently no other cases were recognized until after Pick's thorough study of the subject.

2 Gebhard (1899), in his book on "Gynecological Pathology", refers to a cyst of the vulva, of which he says, "Some years ago I re-

* A year after operation the patient is entirely well, with no sign of recurrence.

† "Von unvollkommen ausgebildeten Schweissdrüsen ihren Ausgang nehmen."

ceived for examination a most remarkable cyst, whose origin is a complete puzzle to me. It was a little cyst the size of a pea, which was removed from the posterior portion of the labium majus, upon which it was very superficially situated. On microscopic examination, I was surprised to find papillary excrescences in the interior of the cyst, which latter was lined with cylindrical epithelium. The histologic structure was exactly that of the papillary ovarian tumors, but my suspicion that the specimen might represent a metastasis from such a neoplasm was not borne out by the clinical examination, so that I am completely at a loss to determine from what structures the little cyst may have originated." Ruge (see below) says that he has subsequently examined the slides of this case, and that it unquestionably belongs to the group of sweat-gland adenomas.

3. Schickele (1902) reports a little soft, freely movable nodule, the size of a cherry-stone, occurring in the upper third of the right labium minus of a thirty-five-year-old woman. It had been noticed by the patient for a few weeks only. On section, the tumor was seen to consist of a tangled mass of gland tubules, at first glance suggesting an adenocarcinoma of the corpus uteri. The tumor was everywhere separated by a layer of fibrous tissue from the overlying epidermis, with which no connection was demonstrable. The author considered the tumor as arising from misplaced persistent remains of the Wolffian duct, although he admitted his inability to give definite proof of this. Pick considers this tumor certainly of sweat-gland origin.

4. Pick (1904). Case I.—The patient was unmarried, forty-nine years of age. Two years before coming under observation a small tumor had been removed from the lower portion of the left labium; it was not examined. A similar nodule subsequently developed on almost exactly the same spot, and an additional one on the right labium. The one on the left side was in the region of Bartholin's gland, the one on the right at the level of the urinary meatus. Both were freely movable. The tumors were excised, and two years later there was no sign of further recurrence. Microscopic examination of the tumor from the left side showed the connective tissue of the corium surrounding a tumor of about 3 mm. diameter, the latter being separated from the surface epithelium by a fibrous zone about 0.5 mm. broad. The tumor itself was found to be composed of irregular gland tubules, with a minimum of connective-tissue stroma; the acini were enormously varied in form and arrangement, some being long and narrow, running more or less parallel to each other, others tortuous, "*ineinander verschlungen*." In places the histologic picture strongly suggested a malignant adenoma. The lining of the acini was seen to be, for the most part, double layered—toward the lumen a row of tall, cylindrical epithelium, with sharply defined free border and somewhat basal nuclei; outside of these a row of smaller, darker, more irregular nuclei, surrounded by a small amount of protoplasm. In some of the acini, especially the larger, this layer appeared broken, or entirely lacking. The acini

and cysts appeared, for the most part, empty but here and there showed fine granular contents and desquamated epithelium. The stroma consisted of fibrous tissue, with a distinct membrana propria containing elastic tissue around the acini. The surrounding corium appeared normal, with a few hypertrophic and cystic sweat glands, showing no connection with the tumor. The surface epithelium likewise appeared normal, but in places showed a distinct dipping down into the connective tissue, forming long narrow canals communicating with the tumor, these canals passing through the entire thickness of the epidermis, and opening on the surface. The nodule from the right side was practically identical in structure, but no communication between the tumor and the surface epithelium was demonstrable.

5. Pick (1904). Case II.—This patient was forty-five years of age. At the lower end of the right labium majus, encroaching upon the skin of the thigh, was a broad-pediced, mushroom-like tumor the size of a pea, moderately firm, movable on the underlying tissue, and covered with smooth skin. A section perpendicular to the pedicle showed an exquisitely glandular growth, measuring 3×2 mm., embedded in the corium. It showed no encapsulation as did Case I. In many of the tubules the same double-layered character of epithelium was noted, and in places a direct connection with the surface epithelium was demonstrable. On the whole, the structure of this tumor was similar to the others.

6. Ruge (1905) reports a small tumor, measuring about 14×7 mm., removed from the lower portion of the right labium majus. It was seen to be situated in the corium, reaching somewhat into the subcutaneous fatty tissue. The main body of the tumor consisted of gland tubules, with very little connective tissue; in places the appearance suggested a papillary ovarian cystoma, with numerous papillary projections into the general cyst cavity. In places the cells lining the acini were seen to lose their cylindrical character, becoming polymorphous and multilayered. From this circumstance, and from the great tortuosity of the acini, and the presence of closely pressed masses of epithelium apparently free in the stroma, Ruge considered the growth certainly malignant. In some areas the epithelium even presented the squamous type, with pearly body formation.

7. Fleischmann (1905). This patient was thirty-seven years of age, unmarried. Three years before coming under observation she had noticed a nodule the size of a pea in the left labium majus, beneath it a smaller one, no larger than a pin-head. After a time the latter began to grow, and caused the patient great anxiety, from fear of cancer. The nodule was removed, and was found on section to be situated in the corium, with a covering of epidermis only at the base, the central portion being ulcerated. The tumor itself was composed of numerous cavities of various sizes and shapes, surrounded by connective-tissue septa, and presenting in places a distinctly papillary appearance. The lining of the tubules was in places distinctly two layered, in others single or multilayered. In

the ulcerated area numerous ducts were seen communicating with the tumor tubules, and passing through the papillary layer of the cutis (which was preserved), to open on the surface.

8. Williamson (1906). This patient was sixty-two years of age. "At the free edge of the right labium majus near its anterior extremity, and at some distance from the orifice of the right vulvo-vaginal gland duct, was a small growth equal in size to a split pea. The growth was soft, pink in color, and ulcerated on the surface. It bled very readily on touch. No enlargement of the inguinal glands could be detected." The growth was removed, and showed no signs of recurrence three years later. On section, the tumor was seen to be composed of glandular tissue partly subdivided into lobules by fibrous septa. Some of the irregular glandular formations were lined by one, others by two or three layers of epithelium; some of the acini were cystic. The illustrations of this specimen present a particularly strong resemblance to the tumor reported in the present paper.

9. Gross (1907) reports the occurrence of four small nodules, each about the size of a pea, in the external genitalia of a woman forty-three years of age. Two of them were in the labia majora, one on the posterior commissure at the juncture of the right labium majus and minus, and one in the furrow between those structures. All were situated in the skin, were freely movable, and had been present for at least ten years—one of them since early childhood. On section, they all showed practically identical structure, consisting of numerous irregular tubules and acini, generally lined with double-layered epithelium—an inner row of tall, columnar cells, and an outer of flatter, much smaller cells. The individual tubules and acini were separated from each other by connective tissue containing many elastic fibers. The tumor was for the most part separated from the overlying epidermis by a thin layer of corium, but in at least one place in each tumor, generally near the center, the epithelium could be seen to dip down in the form of a patulous canal leading into the tumor mass. On account of the straight course of these canals, and of their being lined by a single layer of cuboidal cells, the author does not consider them identical with normal sweat-gland ducts, but say that they certainly present a very close similarity.

10. Schröder (1911). An unmarried woman, thirty-seven years of age, had noticed for ten years a fluctuating cyst in the right labium majus, in the immediate neighborhood of Bartholin's gland; the cyst had recently increased in size to that of a walnut. On being sectioned, the cyst was found to be smooth walled, with a warty excrescence the size of a cherry-stone projecting into the cavity at one point. The cyst wall was composed of connective tissue with some elastic fibers, and showed a double-layered epithelial lining, consisting of cuboidal cells toward the lumen, and flat cells with very little protoplasm outside of these. The little papillary projection into the cyst cavity was found to be made up of numerous gland tubules running in every direction; the lining of these was

varied, but for the most part double layered, like the cyst wall. In places a delicate elastic membrana propria could be made out. No mention is made of any connection with the external surface.

11. Stern (1914). A nodule the size of a pea was removed from the left labium majus incidentally to a prolapse operation. On section, it was found to be composed of a large number of closely placed gland tubules, with a very small amount of stroma, so that the cells of neighboring acini appeared to lie almost *dos à dos*. The picture suggested at first sight a malignant adenoma of the uterus, but the lining consisted everywhere of regular cylindrical epithelium, with no suggestion of atypical proliferation, but with in many instances an outer, second row of flatter cells. No connection could be demonstrated between the tumor and the surface epithelium or skin glands.

SUMMARY.

Of recent years there has come to be recognized a fairly definite group of tumors of the vulva, usually involving the labia majora, and believed to originate from sweat glands. The tumors are small, rarely exceeding a centimeter in diameter, slow-growing, painless, and present few clinical symptoms. They may be single or multiple, unilateral or bilateral. On microscopic examination, they present a papillary cystadenomatous structure, in which certain characteristics of the finer anatomy of normal sweat glands are reproduced. Both histologically and clinically, the tumors of this class so far reported appear to have been for the most part benign, although the possibility of recurrence after removal, or of carcinomatous degeneration, must not be lost sight of.

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PRIMARY SYNCYTIOMA OF THE OVARY.

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(With three illustrations.)

CASE I.—Mrs. S., forty-eight years old, was received at the hospital Sept. 13, 1914.

History.—Puberty at sixteen. Menstruation since then every twenty-eight days, lasting seven days, always with a little pain before and during the first day of the menstruation.

Four pregnancies, the last ten years ago. In every pregnancy, patient almost from the beginning of the pregnancy had nausea and vomiting which continued throughout the pregnancy. Patient had three or four abortions, the last, twelve years ago after two months of pregnancy, was brought on instrumentally.

Since the last pregnancy, ten years ago, patient has had cough but never any expectoration. Repeated examinations of the lungs during these ten years have never shown any pathologic changes of the lungs. Patient is always constipated.

May, 1913, patient had uterine hemorrhages and spells of vomiting without pain. These would last a few days. July and August, patient made a trip to Canada for two months. During this time she had continuous hemorrhages. September, 1913, she was curetted. Very little was removed and this was not examined microscopically. The hemorrhages stopped only for a short time and then returned again. With every hemorrhage, patient had nausea and vomiting.

A year ago at a bimanual examination the ovaries were found normal. In August, 1914, patient herself noticed a swelling of the abdomen. At this time she had continuous vomiting and pain in the right epigastrium. Examination then showed a large right-sided ovarian tumor.

Patient who never in her life weighed more than 125 pounds went down to 91 pounds within the last months. July and August, 1913, alone she lost 8 pounds.

Status.—Patient is thin, pale. No enlarged glands or edema; no varicose veins or goiter. Heart and lungs without pathologic findings. Breasts atrophic. Liver not enlarged. Percussion shows

the stomach extending to midway between umbilicus and symphysis. Right kidney very movable, left kidney not palpable.

Vaginal examination shows: senile atrophy of vulva and vagina. Cervix small, atrophic. Uterus anteverted low in the pelvis, its left horn contains an enlargement the size of a goose's egg. To the right of the uterus there is a roundish, firm, not freely movable tumor of the ovary of the size of a child's head. The left appendages are normal. Urine is normal. Temperature is 98, the pulse is 118, regular, soft.

Diagnosis.—On account of the local findings and the rapid growth of the tumor a diagnosis of a probably malignant tumor of the right ovary was made and immediate operation was recommended.

Operation.—The operation was performed on September 14, 1914, under scopolamin-morphine-ether anesthesia. It lasted fifty minutes and the patient took 200 cc. of ether.

Median incision from symphysis almost to the umbilicus. The greater curvature of the stomach is seen three finger's breadths below the umbilicus. No tumor in the stomach or liver or gall-bladder or either kidney. The enlargement of the uterus is due to a fibroid of the left horn of the uterus. The ovarian tumor is solid, partly soft. The left ovary is very small and consists of two parts, which are almost completely separated. One part is a calcified corpus luteum, the rest is a very small senile ovary. The left tube is in dense adhesions, but not occluded. The right tube extends up on the tumor and is occluded at the end. The tumor is slightly adherent below in the culdesac. The adhesions are easily torn without injuring the tumor.

The operation consisted in removal of the right tumor with the tube, supravaginal amputation of the uterus and removal of the left appendages. The uterus was ventrofixed. Complete suture of the abdominal wall.

In addition thereto a gastrofixation after Rovsing was performed.

Specimen.—The ovarian tumor is round and of the size of a child's head. On halving it, the cut surface is mottled red and brown. The tumor is almost entirely solid, but has a few small cystic spaces which are filled with serous fluid. It has a thin capsule which can be stripped easily in places.

The uterus contains, in addition to the large fibroid in the left horn, several (six) small fibroids. The left adnexa are described above.

There are no tumors anywhere except in the right ovary. Numerous sections through the uterus and the left ovary are made to confirm their freedom from tumors.

Convalescence.—The patient made a slow convalescence and left the hospital after thirty days. From the time of the operation the patient never had any vomiting until the day when she was told that she could go home, when she began to vomit and vomited nine times in one day without any visible cause. The vomiting was treated only with knee-chest position and stopped completely. Until now the vomiting has not returned.

The cough which the patient had had for years did not stop after the operation and Dr. Dickson, the family physician, informs me that she is still coughing, though there is nothing to be found in the lungs.

Patient had edema of the legs after the operation, which disappeared before she left the hospital.

The wound healed with suppuration in the lower angle.

At the time of discharge of the patient the following status was found:

The cervix is high in the pelvis. To the left there is a slight



FIG. 1.—Primary syncytioma. Magnified 60 diameters.

thickening of the base of the broad ligament. The right broad ligament is soft and thin. The stomach sound reaches to one finger's width below the umbilicus.

Microscopic Examination.—The thin capsule of the tumor consists of parallel connective-tissue fibers between which there is considerable edema. A number of blood-vessels are seen in this connective tissue, most of which are filled with fresh blood. The capsule sends a few thin strands of connective tissue into the substance of the tumor, but they are very slender and are lost almost im-

mediately below the surface, and the center of the tumor consists entirely of tumor elements without any normal structures.

The connective tissue of the capsule is inlaid in parts with tumor elements in more or less solid masses, in other parts the connective-tissue fibers separate and leave open spaces of various dimensions. The open spaces are lined with tumor elements (Fig. 2). The centers of these spaces are occupied either by degenerated (Fig. 1) or by actively growing tumor elements (Fig. 2) or by fresh or degenerated red blood cells and fibrin or by combinations of all of these.

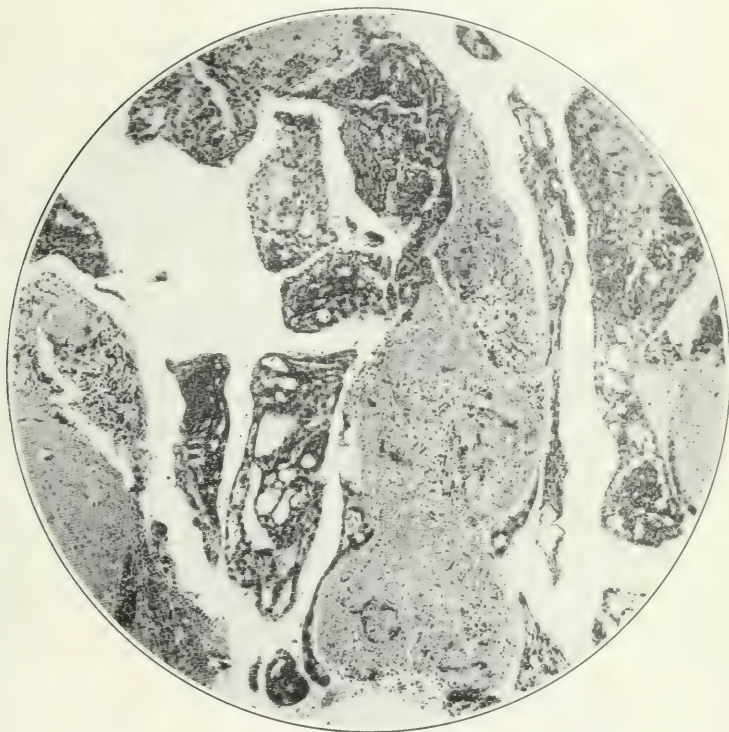


FIG. 2.—Primary syncytioma. Magnified 60 diameters.

The tumor elements consist in the majority of protoplasmic masses not divided into individual cells and containing large numbers of nuclei (Fig. 3). The protoplasm stains more or less dark with hematoxylin and the nuclei stain even darker. The nuclei are large and show distinct nucleoli in varying numbers. The protoplasmic masses form many and bizarre shapes, ribbons, garlands, arches, or appear vacuolated (Figs. 1 and 2). They occupy large areas and dominate the microscopic appearance of the tumor.

Light cells with distinct cell outlines and lightly staining nuclei

(Langhans's cells) are present here and there in among the syncytial masses, but are in the minority.

The syncytial masses show degeneration in many areas. The nuclei become pyknotic or have broken into many granules (Fig. 3), the protoplasmic substance becomes granular or shows fine parallel stripes. In these areas many polymorphonuclear leukocytes are seen in the degenerated protoplasmic masses.

The well-stained parts of the tumor are very much in the minority

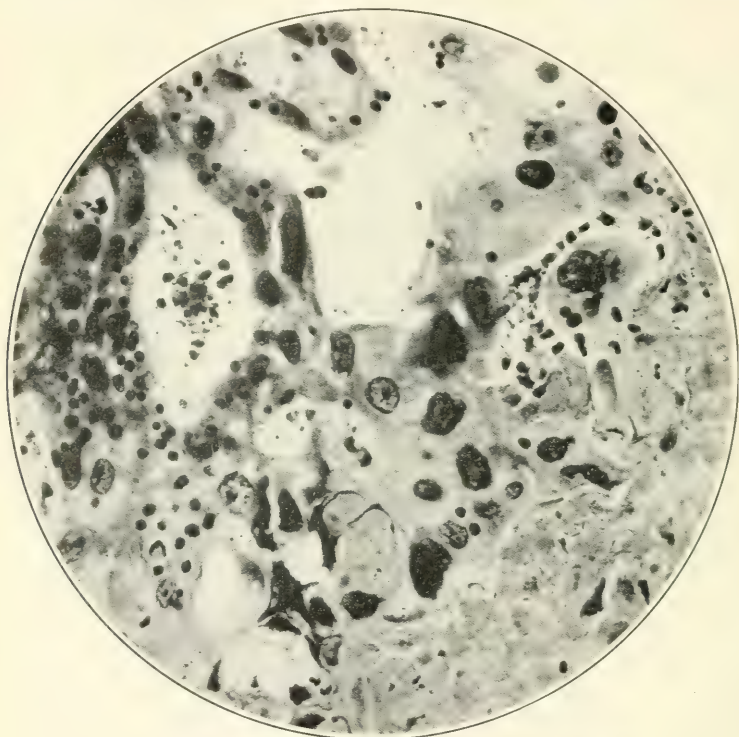


FIG. 3.—Primary syncytioma. Magnified 275 diameters.

in comparison with the areas which are pale and show varying degrees of necrosis (Figs. 1 and 2). While in some places the outlines of the syncytial masses are fairly distinct and a few pyknotic nuclei are visible here and there, in other areas the whole mass stains only a faint pinkish blue. In these areas fibrin and more or less fresh erythrocytes occupy large parts of the field.

The uterus, both tubes and the left ovary are free from tumor or other pathological conditions.

From the microscopic findings a diagnosis of syncytioma malignum or chorioepithelioma malignum of the ovary was made. The

typical syncytial masses and Langhans's cells, the extensive hemorrhagic and necrotic areas left no doubt about this diagnosis.

LITERATURE.

The literature of the last few years contains, as far as I could find out, only six similar cases, one reported by Kleinhans in 1902, two by Iwase in 1908, one by Klotz in 1913, one by Albrecht in 1913, one by Risel in 1914. These cases are reviewed here in abstract:

Kleinhans (*Zentralblatt fuer Gynaekologie*, 1902, p. 1148): Left subserous hemorrhagic tumor belonging to the ovary and invading the neighborhood diffusely. Tube not involved. Tube and ovary removed. Histologically chorioepithelioma. Tumor partly surrounded by a capsule which contains ovarian tissue. Numerous small tumors in the tubal wall. Exitus. Postmortem shows metastases in lungs and vagina. Uterus and adnexa of the other side free.

Iwase (*Archiv fuer Gynaekologie*, 1908) from Doederlein's clinic:

CASE I.—Patient, thirty-one years old, had irregular and protracted hemorrhages since April, 1907, after the menstruation had failed to appear in March. Three vaginal tumors and to the right of the uterus movable round tumor size of an apple. Operation July 19, 1907. Tumor size of two fists bluish red, not adherent. Left adnexa normal, not removed. Removal of vaginal tumors. Two weeks after the operation bloody sputum in which tumor cells are found. August 3, recurrence under the pubic arch. August 12, discharged. Death one week later. No postmortem. Tumor consists of typical syncytial and Langhans' cells, large masses of fibrin, red and white blood corpuscles. The tumor elements penetrate the vessel walls. Tube and uterus free from tumors and from decidual reaction. Some healthy ovarian tissue in the tumor. Vaginal metastases are of the same structure as the ovarian tumor. Recurrence of the same nature as the primary tumor.

CASE II.—Patient, forty-two years old, had eleven labors from 1891 to 1906. Last menstruation June 18–20, 1907. Since then no menstruation. Pain in the abdomen. Middle of September discharge of a few drops of blood. October 15–17, the same. To the left of the uterus tumor size of a goose egg moderately firm with smooth surface. October 21, operation after the type of the carcinoma operation with removal of the entire uterus. Good recovery. Tumor is adherent to the uterus but does not penetrate it. In the right ovary hemorrhagic spot size of a hazelnut. Tumor consists of syncytium and Langhans' cells, tumor cells penetrate the vessels. Parts of the tumor are necrotic. The metastasis in the right ovary shows the same structure as the primary tumor

besides normal ovarian tissue. Both tubes and the uterus are normal.

Klotz (*Beitraege zur Geburtshuelfe*, 1913, vol. xvii): Patient, thirty years old, six labors, last one and one-half years ago. Since then menstruation every five weeks (instead of every four weeks as before) and lasting eight days (instead of four as before). No irregular hemorrhages. Pain in the abdomen. To the right of uterus intraligamentary tumor size of a child's head. Laparotomy. Tumor bluish. Some coils of intestine adherent to it. Tumor removed with right tube. Small particles left in the culdesac and on the adherent intestinal coils. Tumor brownish red throughout. Chorioepithelioma with syncytium and Langhans' cells with extensive necrosis and hemorrhages. Villi-like formations predominate which lie in the blood spaces. No vessels to be seen in the villi. No remnants of ovarian tissue. A connective-tissue capsule surrounds the tumor masses. Two months later recurrence and radical operation. Tumor had invaded the sigmoid flexure, the uterus and the left ovary. Microscopical structure same as that of the primary tumor. The operation was incomplete. Further reports are lacking. The tumor had invaded the uterus from without. No tumor of the mucosa of the uterus. Tubes free. No decidual reaction.

Albrecht (*Zentralblatt fuer Gynaekologie*, 1913, p. 623): Tumor of the right ovary, size of a child's head, mostly necrotic, full of hemorrhages in a virgin of eighteen years. Histologically chorioepithelioma. Five months after the removal of the primary tumor patient died of metastases.

Risel (*Zentralblatt fuer Pathologie*, 1914, p. 420): Patient twenty-five years old, had three normal labors, last one eight months before the operation. No abortions. Menstruation had been irregular after the last labor, the last one six months after the labor. Six or seven weeks before the operation slight irregular hemorrhages began and lasted about two weeks. Uterus slightly enlarged, no tumor palpable otherwise. Three weeks before the operation pain began in the right side. Tumor discovered in the right side which was supposed to be an extrauterine pregnancy. Operation: Hemorrhagic tumor of right ovary size of a child's head, which tore during the operation. Microscopically chorioepithelioma, mostly of the atypical form; no other tissue. Death fourteen days after the operation after the patient had had bloody sputum. Post-mortem: Extensive infiltration of the serosa of the pelvis, small metastases in vagina and wall of bladder. Many in liver, both lungs, prevertebral and mesenteric lymph glands. Tubes and uterus entirely free. In the fundus of the uterus a small brownish scar which on microscopic examination shows a mass of clear lipoid-containing granulation cells with a good deal of blood pigment and destruction of the elastic fibers of the uterine muscle and vessels. These are considered to be remnants after spontaneous expulsion of the primary tumor which may have started from the last normal pregnancy and was expelled seven months after labor.

RÉSUMÉ OF OBSERVATIONS.

With the exception of Iwase's Case II and my case which were respectively forty-two and forty-eight years old, the patients were all young, eighteen, twenty-five, thirty and thirty-one years old. They were all parous women with the exception of Albrechts's case observed in a virgin. The history of most of them shows irregularity of menstruation or protracted and irregular hemorrhages preceding the discovery of the tumor. The growth of the tumor has been found very rapid wherever there was a chance to observe it. Pain in the abdomen is a common symptom.

The intervals from the termination of the last pregnancy, probable or certain, and the discovery of the tumor were:

One month.....	Iwase's Case II
Three months.....	Iwase's Case I
Eight months.....	Risel's case
Eighteen months.....	Klotz' case

In my case hemorrhages began and continued irregularly from May, 1913, till the operation, but an examination by the family physician one year before the operation failed to reveal a tumor. There is no distinct history of a pregnancy preceding the hemorrhages in May, 1913. The last normal pregnancy dated back ten years. The question as to whether it is possible that remnants of pregnancy may have remained dormant for such a long time and may then have assumed malignant growth will be considered below.

None of the tumors exceeded the size of a child's head. Their shape was always roundish. The cut section always was characterized by hemorrhagic appearance. Ovarian tissue was mostly absent entirely. While all the above-mentioned authors consider their tumors primary tumors of the ovary, only my case so far was unaccompanied by metastases in other organs. All other cases either had metastases at the time of the operation or showed them soon afterward. My case is now apparently free from recurrence seven months after the operation. Albrecht's case died five months after the operation of metastases. The patients of Kleinhans, Iwase's Case I, Risel's case died very shortly after the operation. Klotz' case had recurrence two months after the operation, was operated again and further reports are lacking. Postoperative report is also lacking in Iwase's Case II. To sum up:

Out of seven cases reported three died very shortly; one died five months afterward of metastases; one recurred after two months, was reoperated and further reports are lacking; one recovered from the operation, but postoperative report is lacking; one is alive and apparently free from metastases seven months after the operation.

Treatment.—The clinical picture is therefore one of extreme malignancy. The operations should, therefore, be extensive and even in the apparent absence of the metastases in uterus and the

other ovary, both appendages and at least the body of the uterus should be removed.

The operation in the presence of vaginal metastases has evidently not been very successful, but in view of the repeated reports of cases of chorioepithelioma which remained healed after incomplete operations, operative efforts are justified even in these cases. Some recent reports encourage the hope that x-ray treatment of vaginal metastases may be successful.

Pathogenesis.—Looking at the mass removed in our case one is tempted to question whether it really is a tumor or an ovarian pregnancy which has become destroyed by hemorrhages. But the total absence of anything like normal villi and the total lack of any structure resembling a placenta, the destruction of the ovary to such an extent that nothing of normal ovarian stroma is to be found even on microscopic examination and the continued and rapid growth of the tumor immediately exclude the interpretation of the tumor as an apoplectic ovarian pregnancy.

If then there is no question but what this tumor is a true tumor and a chorioepithelioma the next question is: where did it originate from?

An ovarian syncytioma can originate in a pregnancy of the bearer and that pregnancy may have taken place in the uterus, the tube or the ovary. If the original pregnancy was in the uterus or the tube, then the ovarian syncytioma would have to be considered an ectopic syncytioma. If the original pregnancy was located in the ovary then the syncytioma would be analogous to the uterine syncytioma following uterine pregnancy. The absence of any tumor in the uterus or tube in our case and of even a trace of any point at which a uterine or tubal syncytioma might have existed and from which it might have been expelled completely and spontaneously (as Risel assumes in his case) is no proof that such a pregnancy might not have existed, as there are sufficient cases in the literature of ectopic syncytiomas where the uterus was proven to be free from tumor.

The fact that the last pregnancy was ten years before this patient presented the tumor is no proof against the origin of the syncytioma in this pregnancy, as the literature contains a number of cases in which the interval between the last pregnancy and the observation of the tumor was one of years. Besides it is uncertain whether the hemorrhages which in our patient began in May, 1913, that is fifteen months before the tumor was noticed, were due to an unnoticed

abortion or not. The history of the patient therefore does not militate against the assumption of a primary uterine pregnancy.

A syncytioma of the ovary can take its origin from an uterine pregnancy in two ways: either the syncytioma has developed in the placenta in the uterus, has given rise to a metastatic growth in the ovary and was then expelled completely, while the ovarian tumor continued to grow, or secondly, the uterine pregnancy was the starting-point of some villi or masses of syncytium and Langhans' cells which were deported, reached the ovary and did not assume malignant nature until after they had been planted in the ovary.

In view of the negative findings in the uterus and the tubes of our case neither one of these two modes of origin of the tumor can be assumed or excluded.

It is furthermore possible that the patient had an ovarian pregnancy which gave rise to this syncytioma and we have no way of proving or disproving this possibility.

In view of the teratomatous syncytiomas of the testis which have been described (Schlagenhauser, R. Frank) and in view of the teratomatous chorioepitheliomas of the ovary which have been described (Pick and others), the case of Albrecht observed in an eighteen-year-old virgin acquires a peculiar importance. These cases prove the possibility of the origin of the chorioepithelioma from teratomas either of the ovary or some other organ. If the teratoma developed in the ovary the syncytioma would be a primary tumor, if the primary teratoma developed in another organ the ovarian chorioepithelioma would be a metastatic tumor. As in our case seven months have elapsed since the operation and the patient is free from signs of tumor, it is not likely that the ovarian chorioepithelioma was a metastatic tumor from a teratoma which has so far evaded our observation, because seven months are not likely to pass without such a teratoma having been heard from.

However, the possibility of the origin of this ovarian tumor from a primary ovarian teratoma is not to be denied, though no other teratomatous structures were found in the ovary in spite of numerous sections from many parts of the tumor.

There are therefore four possibilities of explaining the origin of this chorioepithelioma:

1. Ovarian pregnancy.
2. Uterine pregnancy in which a chorioepithelioma developed with subsequent complete expulsion of the primary tumor.
3. Uterine pregnancy with deportation of trophoblast masses into the ovary where they became malignant.

4. Primary teratoma of the ovary with predominating chorioepitheliomatous development.

There are at present no methods of determining which of these four modes obtained in our case.

30 NORTH MICHIGAN BOULEVARD.

AN IMPROVED IONIZATION METHOD FOR THE
TREATMENT OF CARCINOMA OF THE CERVIX;
SINUSOIDAL GALVANIC REVERSAL CURRENT
IN ENTEROPTOSIS AND PELVIC RELAXA-
TIONS; TWO NEW ELECTRICAL
METHODS IN GYNECOLOGY

BY

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It is a source of great satisfaction to me to participate in an electrical symposium in the Obstetrical Society. In my pioneer work in this line, in the '80's and '90's, any contributions to the subject on this floor were always solitary and lonely, though at times hotly discussed.

Volumes have been, and many more will be written on electricity in gynecology, but I ask your attention this evening to a brief outline of two widely different procedures in gynecology, associated only by their utilization of the ordinary direct current of 110 volts, commonly known among physicians as the galvanic current.

An Improved Ionization Method for the Treatment of Carcinoma of the Cervix.—The method originally employed by me in the ionic destruction of carcinoma of the cervix, as devised some twenty years ago, was unipolar, in which, with the patient under general anesthesia, pointed anodes of zinc coated with mercury were inserted in the growth, the circuit being completed by a large cathodic, or negative, pad on the abdomen. When 500 to 1000 milliamperes of the direct current were turned on the zinc-mercury electrodes became ionized or dissolved and the zinc and mercury ions were dispersed radially throughout the growth, with the development of considerable heat in the immediate vicinity of the electrodes. The usual whitish-gray, sterile destruction of the growth occurred, an action that would of course extend beyond the limits of the disease if permitted; and it was the difficulty of estimating the depth of the destruction that handicapped a method in this situation that has been quite effective in eradicating carcinomas and sarcomas in other portions of the body.

The changes found necessary were: (1) the inclusion of both poles within the edges of the growth, the negative as a single electrode in the center and the positive as multiple points in the periphery, thus absolutely controlling the spread and depth of the action save for the slight amount of power that curved outward; (2) the abandonment of mercury and the use of more slender zinc instruments, thus increasing the ionic destruction per unit of current and avoiding the brittleness and clumsiness of the mercury-coated instruments; (3) in carcinoma of the cervix, the division of the treatment into several applications, separated only by the time necessary for the separation of the sloughs produced, a time varying from six to eighteen days. This latter change enables the operator to judge quite accurately as to the effects of the previous application and to gauge subsequent applications more intelligently.

The electrodes now employed are made of strips cut from 132-inch zinc plate and are made 18 inch wide and about 9 inches long, insulated by thin pure rubber tubing fitting tightly except for a half inch at the points. The points are filed sharp and no mercury is used with them. A sufficient length of No. 34 cotton-covered wire is attached securely to the bared non-active end to act as conductor of the current. But two electrodes may be used, one positive and one negative, if the growth is small, but usually three or four of these positive electrodes are used, inserted around the periphery with the negative in the middle. This negative may be exactly similar to the positive, zinc being a convenient metal to make it of though it is not ionized at this pole; it may be blunt and with cotton around the tip, if there is room; or it may be a self-retaining negative, made of zinc and modeled after a long-shanked cork screw about the diameter of a lead pencil.

The positive electrodes are inserted without a speculum, preferably by touch, as giving a better opportunity for accurate placement. With the electrodes thus inserted and held in place, an assistant slips a cylindrical glass speculum up over the conducting wires and electrodes and the speculum is then gently rotated into place, the electrodes being meantime held rigidly in position. A miniature diagnostic lamp enclosed in a slender glass tube may then be inserted alongside the electrodes and left in position during the operation, guiding us in the proper insertion of the negative electrode by sight and in the progress of the ionization as the current is gradually turned on by an assistant. As the current reaches 400 or 500 milliamperes the action will show itself in a white radiation from the positive electrodes, a greenish froth from the negative, and a rise

of temperature to near the boiling point between the electrodes, all these effects being greatly increased as the current approaches 1000 milliamperes, which may properly be used under ether. After ten to fifteen minutes the current should be turned off, the electrodes removed, the hydrogen froth swabbed out and fuller examination be made by inspection, after which the electrodes may be inserted in new positions and the current turned on again if necessary. The total duration of the operation is usually from twenty-five to forty minutes. Some tenderness will be felt the following day but no genuine pain.

No unfavorable effects have been noted after any of these electrochemico-thermic curettages, but I am not yet in a position to give statistics of final results. The following case may be related as an illustration:

Mrs. B., aged forty-five, was brought to the Sanitarium by Dr. Chas. Hoffman, of New York, September 5, 1914. During the Christmas season, nine months before, she had felt a heavy sensation in the pelvis on assuming the sitting posture suddenly, followed during the winter by a general impairment of health. In March she had a copious, unprovoked hemorrhage, and on examination by her physician an inoperable carcinoma of the cervix was discovered. Radium was employed without benefit and was abandoned, as her condition grew steadily worse. Menstruation was replaced by a prolonged dribble and foul leucorrheal discharges.

On admission the patient was anemic, weak and with poor color. Examination showed that the cervix had disappeared by erosion and was replaced by a carcinomatous ulceration with necrotic edges enclosing broken-down material with the characteristic carcinomatous odor. The examination provoked considerable bleeding, and it was difficult to ascertain the degree of mobility of the mass because of extension to the upper vagina.

On account of the poor condition of the patient it was decided to make the first application under a hypodermic injection of hyoscine-morphia-cactoid only. A current of 400 to 500 milliamperes was reached without much discomfort, the current being mainly confined to diseased tissue, the duration being forty minutes.

A very foul slough came away six days later, with slight hemorrhage, and on the seventh day, September 12, the second application was made under the same quieting medication. This time the patient could stand but 200 milliamperes, which was continued for thirty-three minutes. At the third morphia-hyoscin application, October 3, the patient complained when 60 milliamperes was attained and maintained for an hour.

On October 22 the following conditions were present: A wound occupied the upper end of the vagina about the size of a silver half dollar with edges showing a narrow border of disease for about two-thirds of its circumference and questionable granulations in its

bottom. Disease was undoubtedly present, though greatly reduced in extent. In view of the increasing pain of the last two applications and their decreasing effectiveness, the patient was given ether on this occasion and 400 milliamperes applied for twenty-three minutes. A firm slough separated in due time, leaving a healthy granulating wound. The patient was discharged November 7 with the wound contracted to a diameter barely admitting the tip of the index-finger and with soft healthy edges.

The last examination was made January 16, 1915, revealing the upper vagina contracted to a point about an opening that would only admit the tip of a large uterine sound, with all edges soft and apparently healthy. The patient had regained excellent color and was feeling better than for a number of years past.

Sinusoidal Galvanic Reversals in Enteroptosis and Pelvic Relaxations.—Assuming that sagging and displacements of the hollow viscera of the abdomen and pelvis involve lack of tone in the muscular walls of these organs as an important factor, it is evident that increased tonicity from repeated electrical stimulation of these structures would be valuable, and even at times curative. Such an idea is by no means new, but there have been difficulties in its application for three reasons: (1) Faradic currents have been used instead of galvanic, unmindful of the fact that faradic currents passed through the abdominal walls have little or no action on involuntary muscular fibers; (2) the electrode skin contacts have not been made sufficiently perfect with moist kaolin or clay pads to get enough current through for the work; and (3) we have not used a machine to pump this muscle power, so to speak, into our patients for sufficiently long periods to obtain the best results, without fatigue on the part of the operator.

In order that this question may be made clear I will say a few words on the question of why a sinusoidal reversal of the galvanic current, slowly made, is most effective in visceral ptoses and the abdominal form of neurasthenia.

It should first be stated that electric currents of a strength possible in ordinary percutaneous medical applications produce motor and sensory responses by reason of wave-like rises and falls of potential. A single wave produces a single contraction. If these waves succeed each other close enough there will be more or less blending of the separate contractions into a tetanic contraction, as in the ordinary fast faradic current. Leduc has pointed out that the best frequency of these waves for the production of this tetanic contraction of voluntary muscle is 100 waves per second. As the frequency increases above 100 per second the completeness of the tetanic

contraction of voluntary muscle lessens, until when the frequency reaches 10,000 per second neither muscle nor nerve respond—the stimulus periods are too brief. The point of division between low-frequency currents, that stimulate muscle of any kind, and high-frequency currents that do not contract muscle but produce thermic, inhibitory and other effects is therefore 10,000 waves per second, though really effective high-frequency currents have waves of a frequency of a million or more per second.

High-frequency currents are then to be ruled out if we wish to stimulate muscle of any kind.

Low-frequency currents, while valuable for contracting voluntary muscles, have much less action on involuntary muscle than single waves for the reason that the duration of each wave is too brief, but the one four-hundredth of a second. This lack of duration also means lack of amperage, which is essential in the stimulation of involuntary muscle.

Practical experiments have shown that involuntary or smooth muscles respond best to a wave produced by the interruption of a galvanic current of considerable amperage not oftener than once in two seconds, the response being proportional to the strength of current during a portion of the increase. Such a wave is also effective in voluntary muscles. Physiologists have shown also that an electric wave that is effective in the stimulation of involuntary muscle always stimulates it to normal functionation; that is, that the stimulus produces a systematic vermicular motion that is propagated to a distance from the point of stimulus and always in a normal direction. Peristalsis, not antiperistalsis, is produced in the intestine, and a motion in the ureter walls from the kidney to the bladder, etc.

From these facts it is evident that the muscular layers of the intestinal tract, the bladder, uterus and other internal organs are best contracted by single reversals of a considerable milliamperage of the galvanic current, and that the voluntary muscles of the abdominal and pelvic walls and floor are as well contracted by such a current as by the faradic currents which fail to act on the involuntary muscles. The old-fashioned name for these galvanic reversals was "galvanic alternatives," and they were applied, when the patient permitted you to apply them, by turning on a strong galvanic current with the electrodes in position and flashing the current back and forth by sudden reversals of the metal pole changer. The extreme painfulness of this form of current wave made it quite impossible of employment until the discovery was made recently of the

comparative painlessness of the same wave when a sinusoidal curve was given to it. Such a curve, which eliminates all shock because of a smooth, sine-like rise and fall, gives a maximum of motor response with a minimum of sensory.

The production of these sinusoidal galvanic reversal waves by a machine run by an electric motor makes it now possible to apply them to patients for a sufficient time at each treatment to get good results. These machines, of course, require to be supplied by a 110-volt direct current, which is manipulated, not produced, by the machine. Low-frequency sinusoidal currents are also manipulated by these machines, but they are no better than other low-frequency currents in the stimulation of involuntary muscle.

For stimulation of the abdominal walls and contents by this current the patient is placed in the dorsal position with the abdomen and back free of clothing. A warm, moist kaolin pad, large enough to cover the lower third of the thorax and the whole of the lumbar region, with its thin metal plate beneath it, is then slipped beneath the back and its wire attached to a binding post. The other pad, about 6 or 7 inches in diameter, is placed on the middle of the abdomen with its plate on top connected with the other binding post. With the patient's controller set at no current, the motor and reverser are started and the controller is then turned on until motion is observed in the abdominal and dorsal muscles. The patient's comfort should be our guide in gauging the strength of current at the maximum of each wave, but it will usually be found that they can take from 70 to 125 milliamperes.

With one wave every two seconds and a complete reversal every four seconds, the action under each pad will vary with the polarity, being alternately greater in the back and abdomen as each becomes negative. A rhythmic motion therefore results, involving most muscles of the torso in powerful contractions when the current nears 100 milliamperes in a healthy subject. In weak patients the contractions will not at first be as strong as the current used should produce and fatigue will appear at the end of ten or twelve minutes, which should dictate the termination of the application for that day. Later, the duration should be increased to fifteen or twenty minutes daily or thrice weekly.

After one or two weeks' treatment it will be noted that the same current will produce contractions of greater amplitude, and this amplitude will continue to grow greater during the course of the treatment.

It is of course true that these evident contractions are altogether

confined to the voluntary muscles of the abdominal wall, rendering the treatment extremely valuable, by the way, in relaxations of these muscles. But that slow, vermicular intestinal and bladder contractions do occur when we employ as much as 50 to 100 milli-amperes is evidenced by the fact that moderate degrees of constipation will usually be benefited in a few days—in two cases after but a single application—and that an incomplete emptying of the bladder at voiding may be steadily improved.

The evidence that gastropptosis and enteropptosis are favorably affected by this treatment is purely clinical in my own experience, but I believe Dr. J. H. Burch, of Syracuse, N. Y., has obtained confirmatory evidence of good results as revealed by bismuth radiography. There has been such steady recession of all symptoms in the cases treated that there can be no doubt of the physical benefit to the relaxed and displaced intestines.

But I do not believe that sarcoplasm stimulation is the only rôle of the large galvanic reversal waves made possible by their sinusoidal shape and the large pads. It was long ago pointed out by Claude Bernard, Erb and others that galvanic stimulation of sympathetic nerves was easily demonstrated, even when the applications were made through the skin and other structures, while faradic stimulation was rarely possible except when the electrodes were placed on the isolated nerve fibers. Galvanic stimulation of the salivary glands, for example, may be readily demonstrated by anyone in a few moments.

We have in the abdomen not only many secretory organs with nerve supplies accessible to these large currents, but the solar plexus itself, doubtless capable of similar excitation. It is possible that stimulation of the solar plexus may account for the improvement of the symptoms of neurasthenia in many cases before permanent correction of the enteropptosis has yet been attained, for among the symptoms that disappear quickest under these abdominal applications the following may be noted: hyperpulsation of the abdominal aorta in the epigastric region in thin, so-called "nervous" patients; a sense of oppression in the epigastrium that is unconnected with ordinary indigestion; inability, or a feeling of inability to breathe deeply in the region of the diaphragm, etc.

In pelvic relaxations the chief factors, aside from tears of the fasciæ, are the voluntary muscles of the pelvic floor and perineal body, yet involuntary muscle relaxations are an important item, notably of the uterus in delayed involution and in the bladder and rectum in cystocele and rectocele. More or less relaxation of the

voluntary and involuntary abdominal muscles are usually associated with pelvic relaxations, and often solar plexus loss of tone, and it is therefore convenient that a pelvic application involves a weak abdominal application also, one pole being in the vagina and the other on the abdomen.

If an abdomino-dorsal application has been already made, the wire connecting the dorsal pad is disconnected and a ball electrode, or one having a short cylinder with shank insulated, is inserted in the vagina and connected with this binding post, when the current may be again turned on for ten to fifteen minutes, the active poles being in the vagina and on the abdominal wall. Currents varying from 40 to as much as 100 milliamperes may be used in this form of application with comfort and without local action on the vaginal mucous membrane.

The pelvic conditions that appear to be most markedly improved by these applications are: rectocele and vesicocele in young and middle-aged women, the improvement showing itself quickly in a better control of the bladder and increased tone in the rectal wall, culminating in some cases in a full retraction of the protruding parts; in various degrees of uterine prolapse; and in particular, in the general loss of tone in the pelvic muscles in married women who have suffered from injury to these muscles in childbirth. The results of a few weeks' treatment in this last only too common condition have been most remarkable in the restoration of the impaired function.

1823 WALLACE STREET.

THE USES OF DESICCATION SURGERY IN GYNECOLOGY.*

BY

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SEVEN years ago I devised, and have since advocated and practised the desiccation method for the reduction of some adventitious growths of the skin and mucous membranes, and since its field of usefulness in anatomic locations of interest to the gynecologist has been proven by clinical experience and tangible results, a presentation of facts concerning it may be of interest to this Society.

My experience up to this time with desiccation has been limited in gynecology to some neoplasms and other lesions, of the urethra,

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labia, vagina, perineum, bladder, uterine cervix, anus and rectum. Lesions in the peritoneal cavity have never been treated by this method, but it is quite possible that it might be effectively employed in some conditions after laparotomy.

Desiccation is indicated for the treatment of the following abnormalities:

Curatively: venereal warts, leukokeratoses, condylomata, moles, pigmentations, chancroids, angiomas, pruritis of nervous and eczematous origin, urethral caruncle, urethral prolapse, erosions and infected glands, lupus, fissures of vagina and rectum, polypi, papillomas of the bladder, vagina, cervix and rectum, erosions of the cervix, hemorrhoids (external and internal), localized epitheliomata and rodent ulcers.

Palliatively: chancre (influencing the treatment and prognosis of lues), advanced epitheliomata of the external genitals and adjacent parts, and inoperable carcinoma of the vagina, cervix, bladder and rectum.

The rationale of the desiccation method is as follows:

The effect of heat when applied to living tissue varies according to its intensity, from simple hyperemia to carbonization. Somewhere between these antithetic points there is a thermic degree the effect of which is more than hyperemia, but not the extreme effect by carbonization. I have called this the desiccation point, because this word seems to describe the effect produced upon tissues better than any other term. When a thermic intensity at the desiccation point is generated, controlled and sustained upon or into a given area of tissue, dehydration of the tissue ensues. The cell capsule is ruptured and what was before living tissue, is then transformed into a dry, inert, sterile mass. These facts have been proven by microscopical studies.) Just enough heat is generated to devitalize tissue without actually carbonizing it. At the desiccation point, living or cadaveric tissue as well as vegetable matter or substances such as hard soap which has been hydrated, may be dehydrated through a sheet of white paper without charring or discoloring the paper, and the transformed matter pulverized between the fingers. The heat is transmitted through the paper without discoloring it for the reason that the thermic degree is not carried to the fusing point, and the paper is not a sufficient obstacle to prevent the heat from being transmitted through it. If the heat intensity is increased, the paper will be charred and if carried farther it will ignite. This desiccating action may be superficial or carried deeply into the tissues at will. Eminent physicists

are in accord with me as to the correctness of the desiccation principle, and I submit this method as an addition to our armamentarium for effectively meeting some surgical conditions.

Percy, in an excellent paper entitled, "A Method of Applying Heat Both to Inhibit and Destroy Inoperable Carcinoma of the Uterus and Vagina," published in *Surgery, Gynecology and Obstetrics* in 1912, explained the practicability of utilizing heat at a degree short of carbonization for inhibiting and destroying malignant growths. In a paper contributed by me to the *New York Medical Journal* in June, 1911, entitled "The Destruction of Surface and Cavity Neoplasms by Desiccation. A New Electrical Effect. Preliminary Report," this same principle was elucidated. Again in August, 1913, in *Surgery, Gynecology and Obstetrics*, I contributed another paper, "Electrical Desiccation as an Adjunct to Surgery, With Special Reference to the Treatment of Cancer," in which the treatment of inoperable cancer of the cervix by applying heat of an intensity insufficient to carbonize was advocated. Dr. Percy doubtless made his observations independently and overlooked the fact that this principle was described before. It is true our methods for generating heat are different, but the principle involved is the same. His work is praiseworthy, but it seems fitting at this time to call attention to my priority in pointing out this principle.

The advantages of desiccation are as follows:

Abnormal tissue may be devitalized rapidly and the operation is bloodless. It is a precise method, the smallest discernible point may be treated, as may a growth covering a large area, and to a depth within the limit of safety. The current has anesthetizing properties if properly applied, and is usually sufficient without other anesthesia. There is a devitalizing action on cells of less vitality than normal cells, somewhat deeper than the desiccated area, the normal cells recovering. This has been shown by the frequent disappearance of malignant tissue at points removed from the area actually desiccated. The current sterilizes the tissue and healing progresses rapidly. Channels are sealed, which lessens the likelihood of metastasis in cases of malignancy. Unlike the result after the use of the cautery, there is absence of contracted cicatricial tissue.

There are no disadvantages to the desiccation method other than the expense and cumbersomeness of necessary apparatus.

Instrumentation: A static apparatus capable of generating a large volume of current is the first essential. An ordinary glass plate machine will not do, even though it may contain a large

number of plates, for the reason that they are not sufficiently cohesive to withstand the amount of necessary speed to generate the current desired, for centrifugal force will cause them to divide. Twelve revolving plates constructed for great durability of a composition of fiber and mica are used in the apparatus designed for desiccation and a 5 horse-power motor propels them up to 2000 revolutions or more a minute. The stationary plates are glass. A static current and not one generated from a Rumkorf coil is used because it is a perfectly steady current, while the current from a coil is interrupted. In this lies the essential difference between the refined desiccation effect and the coarse high-frequency cauterization or destructive fulguration effect. The destructive effect on tissue produced by the coil type of current may be compared to a surgical operation with a saw-edged knife, while the devitalizing effect produced with the static type of current may be likened to the more refined action of a keen-edged bistoury. The unaltered current from the static machine cannot by any manner of application be used for desiccation, but it must undergo a transformation analogous to the changing of water into spray or stream. This is done by introducing into the circuit two Leyden jars and a suitable resonator. The larger the jars, the greater will be the heating action, and *vice versa*. Varying thermic degrees are produced by using jars of different sizes. It is not essential to vary the number of turns of wire in the resonator, if this resonator is constructed according to the proper specifications.

Technic: A Leyden jar is connected with each pole of the machine. The resonator is interposed between them and connected with the outer tin-foil covering of each jar, thus completing the circuit. One end of the resonator is grounded. A wire is carried from the ungrounded side of the resonator to the desiccation applicator. This applicator is supplied with a make-and-break device by means of which the current is controlled at will. A fine needle is inserted in a receptacle at the distal end of the applicator and kept in place by means of a thumb screw. The speed of the plates which controls the current strength, is regulated according to the size and depth of the area desired to be destroyed. This is not done by set rule, but by knowledge gained from technical experience and observation. The rods of the static machine are then separated until the discharge of sparks assumes a characteristic formation, which is known as the point of critical resistance. To produce the desiccation point, it is necessary to have (technically speaking) a perfect balance between the capacity, inductance and

the resistance. The capacity is governed by the size of the Leyden jars, the inductance by the number of turns of wire in the resonator, and the resistance by the length of the spark gap. The patient should be placed upon an operating-table in a position most convenient to expose the growth. The operator sits and rests his elbow and wrist upon some part of the patient or a stand to insure a steady hand. For superficial dehydration, the needle point is not brought in direct contact with the tissue, but an air space varying from 0.25 cm. or less to 2 cm. is interposed between them. The electron waves are thrown from a metal point and projected to the tissue in the form of a fan-shaped flow of sparks following one another with such rapidity that to the eye the appearance is that of a luminous glow. When deep destruction is desired, the patient is grounded and the needle made to just brush the tissues, or in some cases may even be inserted into the tissues. The patient is grounded by approximating a piece of metal to some portion of the bare body and from this a wire is carried to a water pipe or some metallic conductor that leads to the earth. The placing of the operator's free hand upon some exposed portion of the patient's body, adds to the capacity and helps to concentrate the current; this is usually sufficient without grounding. It matters not which pole is used, as this current is unlike the galvanic current, which has electrolytic or chemical properties, and polarity must be considered, whereas the desiccation current from either pole is purely thermic in action. Desiccation should not be confused with electrolysis, cataphoresis, diathermy or fulguration, as they are dissimilar methods.

The Action of Desiccation upon Neoplasms.—Desiccation is contra-indicated in some neoplasms that are covered by healthy skin, as the skin must also be destroyed to reach the diseased tissue; for example, a lipoma or a cyst may be dissected out perfectly satisfactorily, and the skin edges approximated by stitches with a perfectly good cosmetic result, and in lesions like these desiccation has no advantage as there would be a needless loss of skin. Desiccation destroys tissue without opening blood or lymph channels, as it has an immediate styptic action. It sterilizes tissue upon which it acts, as has been shown by experimentation with cultures of various bacteria taken before and after treatment of infected tissue. A dry crust forms as the application progresses, and the time required for separation depends upon the character of the tissue. In the case of mucous membranes, the desiccated tissue soon becomes macerated by the secretions and may separate in a few hours, while on the skin surface it takes a longer time. When the tissue is soft

and vascular, there is greater rapidity of separation than when it is hard and with poor blood supply. Thus a soft mole will slough more readily than a callus. After desiccation of a cutaneous growth, it is unnecessary to apply a surgical dressing, unless for the sake of appearance, as the dry crust offers sufficient protection. The procedure is not entirely painless, but quite bearable, if care is taken with technic. The current, if applied gently at first, has anesthetizing properties, and is usually sufficient, but in supersensitive persons a local anesthetic is employed in addition, either by topical application in the case of mucous membranes, or by infiltration if the lesion is a deep one. In some cases a general anesthetic is required. Nitrous oxide gas and oxygen is used in preference to others, although chloroform may be employed. Ether should never be used on account of its inflammability.

Indications for Desiccation in Gynecology.—In growths, such as venereal warts, leukokeratoses, papillomas, simple and pigmented moles, polypi, angiomas, etc., desiccation is almost uniformly successful, one application being sufficient. The lesion is transformed into a dry crust by the application. This may be immediately curetted or cut away with scissors or it may be allowed to slough away, as seems prudent in the judgment of the operator. After curetting or cutting, if there is bleeding, it is due to imperfect technic. It requires more careful technic to prevent oozing of mucous membrane than it is of the skin. After removal of crust, the base is superficially treated by desiccation. Healing is rapid in most cases and there is no contracted cicatrix, as is the case after cauterization. It seems justifiable to advise the ablation of these lesions for other than cosmetic reasons as it is possible they might sometime in the future become malignant, especially when they are subject to continuous irritation, as they usually are in gynecological locations. The mention of cosmetic effect in these cases is not made in jest, for I have been called upon several times to remove some of these lesions, not with any thought of future malignancy.

Since chancroids are caused by a local infection, desiccation is a rational method for destroying and sterilizing the diseased area and this has been done with success in many cases.

Excision has been advocated in chancre to render less potent the initial source of constitutional syphilitic infection by destroying many spirocheti. Desiccation will destroy this lesion quite as thoroughly as excision and the anatomical contour is better preserved. It devitalizes the spirocheti by heat penetration to a considerable

depth beyond the tissue absolutely destroyed and will do it without opening blood or lymph channels. The advantage seems obvious.

Both lupus vulgaris and erythematosis near the genitals may be successfully treated by desiccation, and the results are almost uniformly successful.

Pruritus vulvæ and ani of the nervous and eczematous types may often be treated with satisfaction by employing the desiccation spark, somewhat attenuated, the heating not carried to actual destruction, and this produces results probably by improving or altering nutrition. In the eczematous form of pruritus, the heating is carried to superficial destruction causing a slight desquamation. In the diabetic and other types of pruritus, this method is obviously not effective as the treatment should be directed toward local cleanliness and the correction of constitutional disease.

Fissures of the vagina and rectum readily yield to desiccation, usually after one application. Dilatation should be practised first in the case of the rectum under local infiltration anesthesia.

Growths in the bladder may be treated successfully, the application being made by means of an insulated wire passed through a catheterizing cystoscope, and brought in direct contact with the growth, the bladder having been first inflated with sterile water or boric acid solution. The same technic is employed as with high-frequency cauterization or destructive fulguration, which has been used with success by many operators.

A papilloma of the bladder may be destroyed by desiccation in one or a series of applications, depending upon its size. The growth appears to be pulverized and is passed away with the urine in the course of a few hours to several days. After ordinary high-frequency cauterization, a coarse slough results and sometimes takes weeks to separate, causing delay when a series of treatments are necessary. Thus it appears that desiccation has the advantage. In carcinoma of the bladder, desiccation offers some hope of success, if seen early, but as a rule, it is only palliative, as all of the cancerous tissue cannot be reached.

Vaginal and cervical growths such as papillomata and polypi, also ulcerations and erosions of these locations may be easily reached and successfully treated by desiccation. A bivalve or a Ferguson speculum is employed to expose the lesion. A whole cervix has been destroyed for extensive erosion and elongation when operation was refused. Repair was rapid and the result excellent.

External hemorrhoids and other anal growths yield to desiccation, and the results leave nothing to be desired. If growths within

the rectum cannot be exposed otherwise, a suitable proctoscope is employed, which may be the air-inflation, fenestrated or plain type. Operative measures are so satisfactory that they are usually to be recommended in extensive internal hemorrhoids with sessile bases in preference to desiccation, but should there be a contraindication to operation, then desiccation may be relied upon as a worthy substitute.

As the gynecologist is frequently called upon to treat breast conditions, it might not be out of place to state that Paget's disease may often be treated with success by desiccation. This is recognized as a precancerous lesion, indeed many observers believe that when this condition appears, it is already malignant and that amputation of the breast and excision of all adjacent glands should be practised. Under these circumstances, I would not advise the desiccation treatment, unless there was a refusal or contraindication to operation.

Application of Desiccation in Malignant Disease.—As a general rule, the treatment of cancer is the same in gynecological typography as in other anatomic locations. I shall submit the classification which I have formulated for personal guidance in the treatment of malignant disease, with observation from clinical experience.

1. *Cutaneous Surfaces.*—(a) Localized: Desiccation in my hand. has been almost uniformly successful in localized epitheliomas and rodent ulcers of the skin. The destruction is carried beyond the diseased area for some distance to insure thorough eradications. Blood and lymph channels are sealed on account of which there is less likelihood of metastasis. Healing is rapid and the cosmetic effect excellent. When a large area is involved, a short course of Röntgen ray treatments following desiccation is advisable, taking advantage of their well-known selective action on cancer cells (devitalization by overstimulation with recovery of normal cells) lest there be some diseased tissue that possibly escaped desiccation. This course may not always be necessary, but it seems prudent to take advantage of this combination treatment. As much can be immediately accomplished by one desiccation application as can be accomplished by the Röntgen rays alone in a comparatively long period of time, and desiccation will cure cases that the Röntgen rays alone will not cure, but in combination, the efficiency of both seems to be increased. The Coolidge tube supersedes the older types for therapeutic work of this kind.

(b) With Metastasis: The results in these cases are usually unsatisfactory by any method, and no claims are made for desiccation except in conjunction with radical operative measures, when

the field may be desiccated after operation in suitable cases to seal blood and lymph channels and to reach points that the scalpel perhaps did not reach. I consider it my duty as a routine measure to treat postoperatively with the Röntgen rays as the best means of guarding against recurrence, promoting comfort to the patient and prolonging life. In some cases radium may be used to advantage, in conjunction with desiccation and the Röntgen rays, but unless a sufficient quantity is available, it had better not be used, as I have seen many cases stimulated to rapid growth by using an insufficient quantity of radium.

2. *Mucous Membranes*.—(a) Localized: In localized cancer of the mucous membranes, the results of desiccation compare favorably with those obtained in localized skin cancers, although there is not the same assurance of success, on account of greater proneness to metastasis and because one cannot be sure that the adjacent glands are not involved, even though they may not be palpable.

(b) With Metastasis: This is the most hopeless class of cases with which the surgeon has to deal, and there is much to be desired with any treatment, known at the present time. Desiccation is used only as a palliative. Unless too far advanced the chance of possible success afforded by radical operation or desiccation followed by the Röntgen ray or radium should not be denied the patient.

3. *Inoperable Cancer*.—In absolutely inoperable cases, whether of the skin or mucous membrane, the initial lesion may be desiccated and massive Röntgen ray dosage or radium applied to the glands and desiccated site. Some unexpected good results have shown that this course is sometimes justified. Early cancer of the cervix should never be treated by desiccation unless there is a very good reason. The chances of cure by radical operation should not be denied the patient. If operable, desiccation as a palliative measure has advantages over the curet and cautery, for the reasons that a general anesthetic is unnecessary, there is less inflammatory reaction, it destroys the accessible diseased tissue quite as effectively, sterilizes, deodorizes and will stop bleeding. The cervix when cancerous is peculiarly insensitive to desiccation, and can usually be treated as radically as desired without even a local anesthetic. This can be accomplished in an office without any apparent shock to the patient.

4. *Postoperative Recurrences*.—Desiccation has a field of usefulness in postoperative recurrences in any location that is accessible.

For example, recurrences along the line of excision in cancer of the breast may sometimes be treated to advantage by this method.

5. *Sarcoma*.—In accessible sarcomas, if seen early, desiccation is a good treatment. In advanced sarcoma, the same general rules apply as in advanced carcinoma.

SUMMARY OF INDICATIONS AND CONCLUSIONS.

1. Desiccation is a successful treatment for all benign neoplasms or other lesions of the external genitalia and adjacent cutaneous surfaces, bladder, urethra, vagina, cervix and rectum in which devitalization of tissue is indicated, and one treatment is usually sufficient. All of such lesions must be regarded as possibly precancerous.

2. Desiccation is curative in the majority of localized malignant lesions of the locations mentioned, although there is not the same assurance of success with mucous membranes as with the skin. In advanced cases, the efficiency is increased by supplementing desiccation, with the Röntgen rays or radium, but success depends in a great measure upon modern technic of applying accurately measured dosage.

3. Desiccation may be regarded as palliative only in cancerous lesions in any location associated with glandular metastasis, in postoperative recurrence and in those cases that are inoperable. The use of desiccation and the Röntgen rays or radium in these cases is justifiable, because sometimes good results beyond expectations are obtained.

4. It would be reprehensible to attempt to treat an early case of cancer of the cervix by desiccation unless there should be a valid reason why radical operative measures should not be employed. Desiccation should be reserved for the inoperable cases of cervical cancer.

5. Desiccation is a refined and efficient method of destroying abnormal tissue. It possesses many advantages and one who has seen it demonstrated and observed the results obtained in cases for which it is indicated, must be impressed with its merits.

There is more technical information concerning the desiccation method than could be incorporated into this paper because space would not permit, but those interested may obtain reprints covering further details by addressing the author.

1809 CHESTNUT STREET.

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STATIC CURRENTS OF VALUE IN GYNECOLOGY.*

BY

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TWENTY-FIVE years ago the office of the progressive doctor was incompletely outfitted, did it not contain a static machine of recent type along with galvanic and faradic apparatus, and considerable interest existed over results achieved by the former with suitable patients. Due, however, to extreme claims for its efficacy made by aggressive advocates of that day and the lack of success in some directions by those whose training in its use was incomplete, enthusiasm waned so that the machine was gradually discarded by reputable physicians excepting, perhaps, neurologists and the few pioneers whose determination to hold to that which is proven could not be shaken. The day, though, has passed when the subject could be dismissed with a knowing shrug of the shoulder and the old-time dictum that "electricity in treatment simply implies suggestion," as the published clinical proceedings of the past quarter century of the American Electro-Therapeutic Association will convincingly prove. As compared with coil transformers and sinusoidal apparatus, static treatment had until quite recent years remained in professional disfavor so that it is a *terra incognita* to

* Read before the Philadelphia Obstetrical Society, February 4, 1915.

many modern physicians, specialists as well as those in family practice.

Now that the mechanism of electrotherapeutic apparatus is designed by expert technicians, alert to every advance in the industrial as well as medical phases of this rapidly widening field, and that physicians broadly trained on the subject base their practice on a better knowledge of the physics of the various currents employed, the profession is awakening to their possibilities in a wide range of illness and injury.

Especially does this hold good of the modalities derived from modern static apparatus whose construction, it is of interest to learn, is so largely American in development. Those of foreign make are smaller in size and output and may be unenclosed, while the cis-Atlantic article includes an almost air tight case to minimize the factor of atmospheric humidity, otherwise interfering so much with production of these particular currents. The static machine of to-day, having at least eight revolving glass, fiber or rubber friction wheels, supplies an absolutely safe product whose volume is only about one-quarter milliampere, its frequency rate from 200 per minute upward according to the variable speed of the actuating motor, while its pressure reaches 10,000 volts. It is this precise dosage and the factor of definite polarity that enable the operator to offer an almost exact prognosis in treatment. The various currents derived from this source, small in volume and of high pressure and relatively high frequency, possess separate qualities and serve distinctive indications. The static methods in daily use are largely those originated by Snow(1) whose research work in this field has brought distinction to our country. The present high standard of static current administration is, therefore, notably American in origin. Unlike the limited range of the continuous (galvanic) and interrupted (faradic) currents that depend on nerve supply for action, static currents pass from the surface into and through underlying structures, thus directly influencing the organs or parts desired. Particularly in gynecic abnormalities do they find a wide field of usefulness and, among progressive physicians, are gradually being reintroduced into office and hospital practice. Of peculiar significance was the recent addition by some of the larger undergraduate medical schools of the United States of practical teaching on the subject. Some clinical experiences, patients being referred by their family attendants, may serve as typical illustrations.

Let us consider that bugbear among minor affections, uterine

subinvolution. These patients willingly take ergot and its synergists *ad libitum*; they may have a full or partial "rest cure," submit to repeated curetments or even major operations when indicated. Only too many of these sufferers, however, in some detail lack the physical quality necessary for subjective reduction of the oversized uterus, and drag along weary years with correlated symptoms unrelieved. It is here, with the patient lying in a modified Sims' position on an insulated chair and a rectal metal electrode, held in place by a vertical standard, actuated by the wave current from the static machine, that direct contraction of the organ can be obtained. I am speaking, of course, of a case that is uncomplicated by pelvic infection. The metal rod, firmly pressed against the anterior rectal wall, delivers a powerful but painless current of rapidly alternating contraction and relaxation of unstriated muscular fiber in the uterine walls that acts to remove all adventitious tissue. Daily repetition soon gives way to treatment on alternate days and these intervals gradually lengthen until, with persistence, return to a relative norm follows. Then, too, the bowel torpor that so often accompanies the subinvolution, if not dependent on obstructive bands, usually disappears coincidentally with the uterine enlargement.

There is an aggravated form of double-sided sciatica that depends directly on uterine subinvolution or retrodisplacement, the condition being reflex from pressure on branches of the sacral plexus. A case of this kind, subinvolution of several years' standing, was successfully treated by the modality just described.

Whether due to defective early training and habit, or that it is acquired later in life, no single symptom is probably more often noted by the gynecologist than that of constipation. As this complication is found present in so many affections, details of treatment of the nonobstructive variety may be summarized. These patients have usually run the gamut of pharmacals without avail for, although incomplete daily stools are possible by such artificial purgation, the probability remains of fecal accumulation with harmful resorption, etc. With such a patient in the knee-chest position, daily high colonic flushings with hot water or perhaps warm sterile oil, through a No. 7 Wales tunnelled rectal bougie, attached to the fountain syringe, until percussion or the skiagram proves absence of collected feces, is therefore a necessary adjunct to successful treatment. The office nurse or a masseuse should be trained in the procedure as experience proves that it is usually incorrectly carried out by the patient or other person. Return of normal

peristaltic function in the intestinal muscular layer may be expected by one or more of several modalities. (1) By the static slow induced current, the patient being recumbent with a 5-in. \times 8-in. metal electrode over the midabdomen and the metal rectal electrode correctly placed. This variety as contrasted with other static currents has a distinctly localized effect; the machine is not grounded but each rheophore is connected with the outer surface of a Leyden jar attached to one of the two poles. (2) With the patient on an insulated chair the static wave current is applied, through an 8-in. \times 10-in. metal electrode on the upper abdomen, to restore functional activity of the underlying abdominal organs. This "wave" current is thus seen to be unipolar, the negative side of the machine grounded for the more powerful condenser effect. In addition to this local action unstripped muscular fiber all over the body is stimulated and a general tonic result induced, of value in these patients who so often are in a debilitated state. (3) As an accessory, better nutrition of intraabdominal organs directly follows the d'Arsonval current from the coil transformer and by radiant light and heat from the high wattage (about 500 c.p.) hooded incandescent lamp. (4) This class of those habitually costive generally have enfeebled abdominal wall muscles and, as they lack initiative for redevelopment through voluntary exercise, this end can be furthered by any one of three sinusoidal methods: (a) That of Bergonié, variously modified, in which the patient lies upon metal electrodes sufficiently large to cover the bared back and attached to one pole of a sinusoidal apparatus; various sized metal electrodes applied to the large muscle groups of the arm, forearm, pectoral, abdominal, femoral and calf regions are attached to the opposite pole when rhythmic muscular contractions under absolute control give the needed exercise. (b) With moistened sponge electrodes applied about 4 inches from the vertebral spines and just below the inferior scapular angles, the suggestion of Kellogg. (c) That of Betton Massey who applies a 10-in. \times 12-in. moistened clay pad, backed by sheet metal, over the lower dorsal and upper lumbar vertebræ and a like one over the abdomen weighted to maintain its position. (5) Rapid sinusoidalization, vibrissage or concussion of the vertebral spines or intervertebral spaces of the three upper lumbar vertebræ to stimulate intestinal peristalsis directly through its nerve supply, the method of Abrams. (6) Mechanical stimulation of the colon, by vibrissage applied directly, completes the physical measures that, with dietary control and, if the patient will persist, home (bending) exercises, should in due time reeducate

the habit of voluntary defecation. Attention to these minutiae will bring success even in cases of many years' standing.

A variety of vesical atony is found at times in patients with general muscular relaxation, where inability to readily or fully empty the organ is the chief difficulty felt. Here, in addition to general roborant methods, local action upon the vesical muscular tissue is needed. With a 4-in. \times 6-in. metal electrode applied above the pubes alternating with the metal rectal electrode *in situ*, systematic exercise is possible of the weakened muscular layer until its former detrusive power is regained.

The vesical irritation that depends on the presence of excess of normal or on adventitious salts in the urine, the result of faulty metabolism or intestinal torpor, calls as a rule for measures like those just advised for removal of constipation. Symptoms complained of vanish with removal of their causative factors.

When urethral caruncle is recent it may be removed by the static wave current when applied through either a glass vacuum or suitable metal electrode. The spark gap should necessarily be a short one and the motor speed not above 200 revolutions per minute. The parts may, however, have undergone hyperplastic change and here, while the prospect for full absorption is less favorable, considerable relief may yet be anticipated.

Ovarian pain, if a simple dysmenorrhea due to acute congestion and with pelvic infection excluded, can as a rule be relieved by the static wave current when a 5-in. \times 7-in. metal electrode is placed upon the abdomen over the aching ovary. Twenty minutes' application, the patient reclining and the motor running with almost its entire current resistance in circuit, will usually bring prompt relief. If this congestion depends on mechanical obstruction to the menstrual flow, so-called pin-hole os, then the same current should be applied between periods by lachrymal or urethral glass vacuum electrodes, increasing sizes being applied through a glass vaginal speculum, and this will gradually and painlessly relax the spasm, if present, or otherwise overcome the obstruction.

Vaginismus is not often met in practice but can be successfully removed by the static wave current through graded rectal glass vacuum electrodes.

The edema of varicose veins from parturition or a pelvic operation can be successfully removed (the acute infection having subsided) by the brush discharge from a static machine along with radiant light and heat or the d'Arsonval coil current. The two latter modalities induce an increased arterial supply with its localized improved

nutrition and absorption while the rhythmic contractile effect of the brush discharge on the distended tissues, lymphatics and veins ensures relief of the accompanying phlebitis and prevention of ultimate obstructive adhesions. Unless treated by operation, elastic hose or bandages should subsequently be worn.

The effleuve or brush discharge is the one static modality in which polarity is reversed, the active wire to the patient on the insulated chair coming from the negative drawbar while the right side is grounded. With the widest possible spark gap the long-handled electrode is held in the operator's hand, attached to a chain from a separate "ground," and continuously swung some 12 or 16 inches from and about the affected region. This motion prevents any irritating local effect. It is as an effleuve or visible brush discharge, leaping across the intervening dielectric and thus completing the circuit, that makes this a distinctly bipolar current.

This brush discharge is useful in another condition that at times tries our therapeutic resources, the vulvar pruritus that accompanies localized moist eczema. Here the deKraft electrode, swung about 6 inches from the surface, is especially applicable as it enables the operator to limit the effleuve to the areas directly involved, and a cure can usually be foretold. This holds true of the pruritus of eczema in any region.

It would carry the subject too far afield to here include affections correlated to those of the pelvis but for which the gynecologist is also often consulted. Such are the neurasthenias, the rectal and pelvic affections, etc., in which static currents are adjuncts to those of the coil transformer. But sufficient has been shown of the wide range of usefulness of the modern high-power friction machine in gynecic practice to warrant its prospective reestablishment in general professional favor.

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21 SOUTH TWENTY-FIRST STREET.

RÖNTGENOTHERAPY IN UTERINE FIBROIDS AND
UTERINE HEMORRHAGE.*

BY

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I WAS among the first to employ the Röntgen rays in the treatment of uterine fibroids and uterine hemorrhage (nonmalignant), having treated my first patient in January, 1906. (My first malignant case in 1901.) My experience therefore extends over a period of nine years, and while I have only treated forty-six nonmalignant cases in this time, the duration of my observation and my interest in the subject during these nine years will permit me to speak with a reasonable degree of assurance.

In my previous papers(1) on this subject I have reviewed briefly the history and the theory of the action of the Röntgen rays in the treatment of uterine fibroid and uterine hemorrhage, and in my paper read before the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association in June, 1914(2), I described the modern technic, and in previous papers I have given detailed reports of cases. Therefore in this paper I shall make an effort to answer some of the questions that continually arise in the minds of the members of the profession and of patients.

During the past nine years there have been treated probably between two and three thousand patients of the class under consideration. Gauss(3) made a statistical summary of 1395 cases that were recorded up to January 1, 1914. Lockyer(4) (published Aug., 1914) from the records of only seven authors collected 1572 cases. If Lockyer is able to collect this number from seven authors it is reasonable to assume that there must be practically twice this number on record. He remarks that almost every article indexed "Myome" during the previous seventeen months in the *Zentralblatt f. Gynäkologie u. Geburtshilfe* related to radiotherapy, and in Germany and France the method of treatment seems to be accepted as one to be considered in every case. It is, therefore, no longer a new and untried method, and if the bad results of treatment,

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subsequent degenerations and serious complications were as prolific following the treatment as some of the authors (Tracy(5)) (McGlinn(6)) seem to think we surely would have met them long before this and would have abandoned the treatment.

The indications for the treatment of hemorrhages due to myomas, as given in my recent paper,(2) are: 1. All cases of myoma in older women in whom there is already a well-advanced anemia, which may be the cause of an anemic heart. 2. All elderly and young women with myomas, in whom there is marked organic heart disease, diabetes mellitus, chronic nephritis, marked lung disease and goiter with cardiac symptoms. 3. All patients beyond the age of forty, in whom there is no contraindication to the treatment. In general, the older the patient and the nearer she has approached the menopause, the more prompt and satisfactory will be the result. Under forty, Röntgenotherapy is not the method of choice, but good results can be obtained, though the younger the patient, the more treatment will be required. Even in patients under forty, if the alternative is complete extirpation of the uterus and adnexa, Röntgenotherapy should be seriously considered, for it is claimed that even with the disappearance of the Graafian follicles and the destruction of the reproductive functions that there is a preservation of the internal secretion (Bordier). It is also possible that there will be a regeneration of the ovaries in young women, with the possibility of subsequent menstruation. This has occurred in one of my patients, a woman of thirty-four, in whom, after all the symptoms of fibroid had disappeared and after complete cessation of the menstrual period for several months, there was a return of normal menstruation which has continued normal for about five years, and now is gradually diminishing. During these five years she has enjoyed excellent health. This possibility should, therefore, be kept in mind. Edelberg(7) reports a case of myoma of the uterus associated with pregnancy in a woman of thirty-eight, six years after her second pregnancy. She was given a course of Röntgen treatment, the ovaries being systematically treated, the total dosage being 146 Kienboeck units. It is estimated that 111 x-units were given before pregnancy and 35 x-units after pregnancy, but the pregnancy proceeded unmolested to normal term and the child seemed absolutely normal and thriving at the seventh week. 4. The intramural or the interstitial variety of tumor gives the best results.

Gauss(3) believes that all cases of myoma should be treated by radiotherapy, because the lowest mortality ever claimed for operative methods is from 3 to 5 per cent., while in his second and third

group, in which the doses were from 175 to 1500 x -units, there were no deaths. He thinks this alone should justify the treatment.

Krönig(8) says his clinic has abandoned the operative treatment of fibroids for the treatment by the Röntgen rays, except in those occasional cases where it appears that myomectomy may leave a functioning uterus for a young woman. The argument is that the Röntgen rays are just as efficient in their action as total ablation and is devoid of all danger to life, while an operation carries with it an operative mortality even if it is small. The artificial menopause symptoms are in general not nearly so pronounced as after operation.

Contraindications.—1. All cases of myomas in which the tumor is pedunculated, or which can be excised without destroying the reproductive powers of the patient. 2. Fibroids that have undergone malignant degeneration, or that have become gangrenous, should not be treated. 3. Fibroids associated with disease of the adnexa. 4. Fibromas which are producing such marked symptoms that the patient is endangered more by waiting two or three months for results of Röntgenotherapy, than by the result of an operation.

The Probability of Cure.—In the critical reviews made by Gauss, he divided the 1395 cases into three groups, according to the dosage given. The first group embraces a total of 693 cases, in which the total dosage amounted to from 50 to 175 Kienböck's x -units. Group II included 544 cases in which the doses varied from 175 to 500 x -units. Group III included 158 patients, who were given doses amounting to from 500 to 1500 x -units. Corresponding to the rise of the total doses in the three groups there is a rise also in the percentage of cures from 72 to 82 and 95 per cent. It can be seen from this that the success attained is greater in proportion to the dose of radiation applied to the surface of the body. To this, however, must also be reckoned the fact that in addition to the increase of the dose, the rays applied in recent years has been more penetrating and more thoroughly filtered. In Group III, so far as he was able to learn, practically all of the cases of myoma and metropathy that presented themselves for treatment were treated, at least this was true at the Freiburg Clinic. Therefore, since all variety of cases in Group III were treated the increase in good results must be due to the improvement in technic. In Group I there was evidence of recurrence in 4 per cent., in Group II of 3 per cent., while in Group III there was no recurrence to record. By recurrence I mean the recurrence of hemorrhage.

It must always be borne in mind that the younger the patient the more treatment will be required. In hemorrhages due to fibroids

I believe it is always desirable to bring about at least a temporary menopause. When the patient is treated from any necessity during the child-bearing period, it will sometimes be an advantage to secure only a temporary cessation of the menses, for it is generally recognized now that the action of the rays is on the tumors as well as on the ovaries. I believe we will find it possible to cause the disappearance of the tumors without actually destroying the action of the ovaries. Fraenkel(g), referring to the treatment of young women, has seen repeatedly amenorrhea produced for a few months, then the patient become pregnant and give birth to perfectly healthy children.

Modern treatment is to-day given in series, each series of doses being separated by an interval of three or four weeks. The menstrual period following the first series of doses is generally uninfluenced, and unless given within ten days preceding the period will probably not be increased. The second period is usually diminished, and the third is usually absent. Therefore one can never judge results inside of two months, and I usually count on from three to six months for the cure. By using the very large doses described by Gauss the duration of treatment can be reduced, but I can see no advantage, and some disadvantage, in bringing about a rapid menopause.

The Tumor.—The tumor is the last to disappear. From a study made in a previous paper(2) I found that 75 per cent. of the tumors had disappeared, but from the fact that in the early cases treated there was a progressive disappearance of the tumors after discontinuing treatment, I am led to believe, but not yet able to prove, that they will probably all disappear. The third case treated was a patient forty-nine years of age, who had a tumor the size of a grapefruit, extending to the umbilicus at the beginning of treatment, at the end of the second year it was the size of an orange, and when last examined, five years after beginning treatment, which is now nearly four years ago, the tumor had entirely disappeared.

Subsequent Degeneration of the Tumor.—The fear of subsequent degeneration of the fibroid has been aroused by a number of men(10), both in personal conversation and in literature. If this were a great likelihood it surely would have developed long before this. This treatment has been in use nine or more years, and the early work was done very much less satisfactorily than it is done to-day, and yet there is no definite records of any such degeneration. Norden-toft(11) remarks in July, 1914, that he has been unable to find on record any evidence of malignant degeneration in the relics of a

myoma or fibroma that has retrogressed under Röntgen treatment. There have appeared, however, two or three cases in which malignancy has been discovered during the course of treatment, which had not been discovered previously. Haenisch(12) reports one case of unrecognized carcinoma. Shoemaker referred to one case in discussion at the Atlantic City Meeting, June, 1914. When one considers the frequent occurrence of carcinoma it is rather remarkable that only so few have shown the development of carcinoma during the course of treatment, for Freund, referred to by Nordentoft, found malignant disease of the uterus or ovary in 6 per cent. of 500 myoma cases, Klein in 7.7 per cent. of 491 cases, and Mackenrodt in 7.7 per cent. in 418 cases. Tracy (referred to by McGlinn(6)) found it in 10 per cent. of his cases. Therefore, if no malignant disease has developed in over 1500 cases that have been treated long enough at least to be placed on record (from 1 to 9 years), and among which with a percentage of 7 per cent. there should have developed over 100 cases of malignant disease if they had been untreated, it would seem to me a rather strong argument in favor of treatment, from the fact that only two or three cases have been recorded in which malignant disease developed during the treatment, or one-fifth of 1 per cent. Since there is apparently 99 or more per cent. less carcinoma in the number of cases treated by the Rontgen rays than are found in the general average, it would suggest very strongly that the rays have a beneficial influence in the prevention of malignant disease or in the cure of early cases of carcinoma. It is true that the most of these cases treated were more or less selected, and carcinoma reasonably eliminated, but in the cases of the Freiburg Clinic, at least, and probably in many others, all patients who applied were treated. Therefore, if we are limited simply to the last 195 cases reported from the Freiburg Clinic there should have been in the ordinary course of events, approximately fifteen cases of cancer develop. There is no record of any such degeneration.

Most patients treated have been more or less under the observation of gynecologists and it is not likely that many cases of carcinoma could have developed, following Röntgen treatment, and not been reported. It seems, therefore, that the fear of subsequent degeneration is entirely without foundation.

The Difficulty of Making an Accurate Diagnosis.—This is an objection that has been raised by most gynecologists, and on the basis of this difficulty and on the statistical basis of the complications that are liable to arise with fibroma of the uterus, a number of papers(5-6) have been written strongly objecting to the Röntgen

treatment. While most Röntgenologists have advised against the treatment of any cases with known complications it does not follow that all these cases with complications are going to die, provided that they are treated with the rays. The statement is often made that it is not the preferable treatment, but it is entirely unfair to assume that any large percentages of these cases will die if treated, for if carcinoma of the pelvis can be made to disappear after it has recurred, following an operation, and if inoperable cases can be made operable or the disease can be made to disappear, as I shall show later, it is surely fair to assume that these early unrecognizable carcinomas may also disappear. Therefore it seems to me an unnecessary fear to be aroused in patients in whom Röntgen treatment has been advised. If complications were as dangerous to the patient as has been indicated, surely many of these 1500 or more patients already recorded would have died and we would know of it. Gauss found death in only half of 1 per cent. in the first group of cases treated, which involved incomplete and undeveloped technic, and no deaths at all in the second and third group, while under operation the operative mortality is at least 2 or 3 per cent., and recurrent mortality much greater.

The action of the rays is effectual on abnormal tissues as well as on the ovary and fibroid. In 75 per cent. of all cases where there had been adhesions of the genital organs, Fraenkel(13) found they had improved or entirely disappeared after Röntgen treatment. Firmly fixed uteri became movable, thick bands in the parametrium softer and less prominent, and bands in Douglas' pouch could no longer be felt when placed under tension. In one case a firmly adherent ovarian cyst became movable. He explains this retrogression of adhesions under Röntgen treatment as being partly mechanical, the myomata as they decrease in size losing the adhesions by traction. In other cases it must be admitted that there is a reduction of the adhesions by the direct action of the Röntgen rays. This was particularly true in adherent uteri and peritoneal tuberculosis, and, in some cases, the retrogression of the adhesions was confirmed on laparotomy.

Complications Arising during Treatment.—There is nothing to prevent an operation if a complication arises during the course of treatment. Generally the patient's hemorrhage will have been controlled, she will be less anemic, and she will stand an operation better than at the beginning. In one of the cases which I have treated, the patient had been extremely anemic from hemorrhage, the fibroid extended to the umbilicus, amenorrhea was produced

and the tumor was reduced to the size of an orange, when she developed symptoms of pelvic abscess. This demanded an operation, which was done at a time when the patient was in much better health than at the beginning, and from which she recovered completely. There was no trouble in the healing of the wound, and the preliminary x -ray treatment had done nothing but good.

POSSIBLE DANGERS FROM THE TREATMENT.

The Skin.—In all Röntgen therapy our first thought is the skin, for the great proportion of the rays are absorbed in the skin and the superficial layers of the tissues, therefore we are limited in the quantity of rays that can be given through any particular area of skin. This has led us to divide the areas, as much as is necessary, so as to get a deep effect by cross-firing, which is nearly or quite equivalent to the effect in the superficial tissues. With good technic, the use of hard rays, filtration by at least 3 mm. of aluminium and a layer of sole leather and careful measurement of dosage, there should be no ill effects on the skin, beyond pigmentation, which disappears and is not objectionable. The degree of pigmentation will vary with the complexion of the patient treated. Dark people show more pigmentation than others, and the light complexioned are apt to show slight redness instead of pigmentation, but a real dermatitis should always be avoided. The pigmentation will disappear just like the tanning from the sun. Fortunately the ovaries and tumor tissue are more sensitive to the rays than the skin, and therefore one can obtain results without damage to the skin.

Visceral Effects.—The possibility of damaging the other viscera has been raised both by gynecologists and Röntgenologists. In a few instances diarrhea has been recorded in literature which lasted for a day or two after treatment, but this probably is a constitutional condition if due to the treatment at all, of which I shall speak later. Accidental diarrhea occurs so commonly, independently of any treatment, and especially in the neurotics, that it can easily be ascribed to any new procedure. There has never been any intestinal irritation in my patients. In two cases of mine slight bladder irritation developed, which lasted a few days, but in one of these, at least, the patient had been subject to this bladder irritation at intervals before this treatment had been instituted. Therefore, I believe it is of no serious importance.

Constitutional Symptoms.—Since we have been using these mass-

ive doses, and giving a great many doses in a short time, a number of patients have complained of lassitude, nausea, and sometimes vomiting, which lasts a day or two, and occasionally three. At first this was thought to be due to an effect upon the ovaries, but I have seen it also in extensive breast treatments, in the treatment of a large sarcoma of the hip and in the treatment of carcinoma of the liver in a man. I believe these effects are due to the inhalation of the gases which are generated in the neighborhood of the high-tension currents. This is noticed now because of the multiplication of doses given on one day, and also because the more penetrating rays now used require a much higher voltage, which gives more brushing from the machine and wires. I am making some investigation along this line and believe that I am gradually eliminating these constitutional effects. I hope to make a more complete report of this subject at a later date.

Menopause Symptoms.—The symptoms associated with the production of an artificial menopause have at no time been severe, and they consist chiefly of flashes of heat and occasional headaches. In some cases these have been practically absent. Krönig says that the symptoms of an artificial menopause are very much less severe after Röntgen treatment than after operation.

Metropathic Hemorrhage.—Metropathic hemorrhage and hemorrhages occurring at the climacterium respond especially well to this form of treatment. Sometimes these hemorrhages occurring at about the normal menopause respond remarkably quickly. Herff(14) says the best results are obtained in climacteric hemorrhage. Of forty-nine patients of this class treated by him all but one were cured. In all of these cases the hemorrhage had resisted the previous measures used. The action is the more prompt the nearer the normal menopause.

Hemorrhage Due to Malignant Disease.—I began the treatment of uterine malignant disease on an advanced inoperable case in 1901. The patient was referred to me by Dr. Elizabeth Peck, at the Philadelphia Hospital. This was at the beginning of Röntgen treatment, at a time when no filtration was used and when we knew little about the control of the rays. I felt justified in treating her very severely, as was done. Two years later she returned to the Philadelphia Hospital because of the degeneration of the skin over the lower abdomen, due to the effects of the rays. At this time all evidence of carcinoma of the pelvis had disappeared, according to the statement made by Dr. Peck. During the subsequent years I treated about fifteen patients, but with only a moderate improvement, and

I abandoned the treatment for about eight years. During the past year I have been much encouraged by the effects of deep Röntgenotherapy and have again treated a few cases of recurrent carcinoma of the pelvis. The patients have improved, but I am not yet prepared to report any specific results in this field.

Amann(15) states that he has applied Röntgenotherapy in fifty-two cases of uterine cancer. In the thirty-one absolutely inoperable cases of cancer of the cervix, five of the patients were completely or nearly cured, 29 per cent. thus being restored to health, when they had been absolutely doomed before. The improved technic accomplishes this, besides without danger of Röntgen burns even with the far more extensive dosage, while the action on the cancer cells is more destructive. When the rays are applied both from front and back to act on an advanced cancer of the cervix, they act on the entire region, all the lymph glands and adjacent tissues feeling the effect, and thus a more thorough clearing out of the malignant disease is possible than could even be realized by operative measures. In one case he had removed a cancer of the cervix three years before and a recurring tumor a year later. Again a tumor as large as a fist developed in the pelvic connective tissue but this was treated with intensive Röntgen exposures and a complete cure followed. The sciatica-like pains and the contracture of the foot from pressure on the nerves vanished and the patient gained in weight. She was in good health for a long time, but died suddenly later without recurrence of pelvic trouble. Amann's experience has been so favorable that he thinks the improved technic for Röntgenotherapy can be applied even in operable cases.

Krönig(8) reports sixty-four cases of carcinoma that were treated for the prevention of secondary growth after operation; of these, forty-three were treated almost exclusively with unfiltered rays, while twenty-one cases were treated partly with filtered and partly with unfiltered rays. Twenty-three of the forty-one cases undoubtedly died of carcinoma. From following the subsequent history of twenty-one cases, in which filtered rays were used, nineteen were undoubtedly free from carcinoma. Sufficient time had not elapsed to speak of them as definite cures, yet the result is so unusual that he says it will have to be credited to the treatment, and that recurrences are not so frequent when filtered rays are used after operation.

Sielmann(16) treated sixteen cases of carcinoma, three were inoperable carcinomas of the cervix, one became free from bleeding and pain and improved in general health, and died of apoplexy at the

age of sixty-one. Two others became free from bleeding and pain with shrinking of the tumor. Six other cases of metastatic carcinoma improved—there was a decrease in bleeding and pain, and a lessening of the malignant discharge. Four cases given postoperative treatment have had no recurrence in the two years. One case of carcinoma of the urethra improved.

Such results as the above, obtained in hopeless cases of carcinoma in which the disease has spread, makes me less fearful of treating a carcinoma that cannot be diagnosed, for if we can cause the disappearance of an extensive distribution of carcinomatous tissue there should be less difficulty in causing the disappearance of an early case. It must not be understood that I am recommending Röntgen treatment in operable cases, but I think that we must not become hysterical and insist upon operating upon every case in which malignant disease cannot be absolutely eliminated. Likewise in sarcoma of the uterus we can act within reason, for it is well known that sarcoma is even more responsive to the Röntgen rays than carcinoma. Miller, writing from the Freiburg Clinic, states that from January 1, 1909, to July 28, 1912, 175 cases of myoma were treated by the rays and none have shown any signs of sarcoma. In 318 myomas operated upon five showed sarcoma. He also showed that of 180 cases of sarcoma operated upon, 79 per cent. failed to be permanently cured. From an analysis of the theoretical probabilities of death from operation or death after x-ray treatment, he concludes that eight-tenths of 1 per cent. will probably die after x-ray treatment, which will compare favorably with 79 per cent. after operative treatment.

The cautions laid down both by gynecologists and Röntgenologists that Röntgenotherapy must be applied by competent operators is of course very important, and even more important than that care should be used in surgical operations, for all physicians receive a certain definite amount of training, both theoretical and practical, in surgery, while many who buy x-ray machines know little or nothing of the theory or the practical applications of the rays in treatment or diagnosis, and a machine will no more accomplish results in this field without the addition of skill than will surgical instruments do good operations, excepting in the hands of a skilled surgeon.

CONCLUSIONS.

1. Röntgenotherapy must be looked upon as a very efficient adjunct to the gynecologist's armamentarium, and while I believe

that the rays should be applied by the Röntgenologist, excepting where the gynecologist has become a Röntgenologist, he should at the same time work hand in hand with the gynecologist.

2. Deep Röntgenotherapy stops the hemorrhage associated with uterine fibroids. This is followed by a gradual disappearance of the tumor. This atrophic process may extend over several years and continues long after the cessation of treatment.

3. The treatment of metropathic hemorrhage is almost uniformly successful.

4. Uterine hemorrhage occurring at the menopause, when not malignant, will usually respond very quickly. There should be an increase in weight and an improvement in the blood condition following treatment, and when this does not occur suspicion of malignancy should be aroused. (Albers-Schönberg.)

5. Some good results can be obtained in inoperable carcinoma. The deep Röntgenotherapy should be especially recommended as postoperative treatment in all cases operated upon for carcinoma.

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1321 SPRUCE STREET.

RADIUM IN GYNECOLOGICAL PRACTICE.*

BY

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THE cure of cancer is actual or symptomatic. In the former instance all malignant tissue is removed or destroyed and recurrence is impossible. In the latter instance we cannot demonstrate the absence of malignant structure at the original seat of attack or elsewhere from incipient metastasis. Watching and participating in the unequal struggle for the mastery of malignant growths by excision, the writer believes with many other operators, that surgical procedure has apparently reached the limit of palliative and curative power, and while holding to the principle that large operable growths belong to the domain of surgery; that surgery and radium are not incompatible but in their utility reciprocal and supplemental.

In my paper entitled "A Conservative Estimate of Radium Therapy from a Clinical Standpoint," appearing in the *New York Medical Journal* of January 9, 1915, is quoted a conservative guide to its use. The efficacy of radium rests on its occult power to inhibit lawless cell proliferation and destroy cancer tissue. "The law of reaction is the governing factor in its use and only by mastery of this art can success be attained. It is assumed a given amount of radium applied at the same distance with the same screening will produce the same results if the tissues to which it is applied, normal or malignant, possess the same resistance. When lack of uniformity in curative results is found, the inference is unmistakable that the individual resistance of the patient's tissues is a controlling factor in radium therapy. Knowledge of such resistance can only be determined by actual application." This principle has been demonstrated to my satisfaction as being clinically and logically correct and is apparently the only natural and rational explanation, why one case is cured by small dosage of radium, while another is irresponsive to

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several times the quantity. The mastery of the art in the application of radium is only acquired by observation and experience, and must be applied in every case, before results can be tested or predicted. In this paper I shall state some of my experience and report a few of my own cases, together with the experience of American and European authorities. Schmitz, in a very able résumé on "Radium and Mesothorium in Uterine Cancer," in the January, 1915, number of *Surgery, Gynecology and Obstetrics* (from which I quote freely as one of the ablest, most conservative and practical statements I have seen) says: "The primary influence of radium in this disease, is really beyond the fondest hopes of its most ardent supporters. By its use many sufferers may be given a new lease of life. This fact has led many a gynecologist to prematurely pronounce the radioactive treatment of cancer as curative when it is only symptomatic of cure. In fact, an inoperable cancer may be made operable within about three to four weeks by the use of 3000 to 4000 milligram hours of radium. The objective changes are restoration of the uterus to its former shape and form—disappearance of infiltration of the parametria and recurrence of former mobility, while the subjective changes are a cessation of hemorrhage and putrid discharge—disappearance of pain and cachexia, and improvement in the general condition of the patient."

The treatment of uterine cancer whether curative or palliative is a matter for clear and discriminating judgment, as its operability hinges on the degree of parametric infiltration and the extension and location of lymphatic metastasis. If inoperable, it belongs to the field of radiumization. This has its limitation. Too small quantities stimulate malignant growth. Too large quantities may perforate hollow organs, blood-vessels and irreparably injure nerve trunks causing destruction of both malignant and normal areas of tissue, as was proven in von Eselberg's clinic in Vienna. The palliative function of radium affords diminution or arrest of pain for days, weeks and sometimes months and gives a new lease of hope to the unfortunate sufferer. I note two cases of its analgesic power.

CASE I.—Mrs. K. A., aged thirty-two, of New Jersey. Advanced inoperable carcinoma of entire uterus—suffering hemorrhage, cachexia and great exhaustion—taking opiates. Commencing September 14, 1914, radium was used twice a week. In less than a month pain was almost absent, hemorrhage controlled, appetite and strength much increased. From this time on, until three weeks before her death in January, 1915, she was almost without pain.

CASE II.—Mrs. D., aged seventy, widow, mother of four children. Came under my care February, 1911, with cervical carcinoma of the cauliflower variety. She was weak, cachectic, with a prospect of living six or eight months. She had three thermocautery operations—each followed by the use of radium; after the second operation healing took place—recurrence followed and radium was used with partial healing. She remained in comfortable health and without pain until January, 1915. It is quite safe to affirm three years of comfort were added to her life.

For ten years it has been my practice in cervical cancer to do the high thermocautery operation—and destroy the endometrium by doming the body, followed by radium. Experience confirms my belief that it is the most efficient method of treatment except as hereafter mentioned.

Panhysterectomy in all malignant conditions of the uterus is the remedy parexcellence before metastasis renders it futile. The particular form of operation rests with the operator.

Krönig says he has seen a large cauliflower of the cervix replaced by a normal cervix in five and one-half weeks, with only a delicate mark for scar by radium. It will be noted that radium therapy is based on prophylactic preoperative and postoperative application. To insure the highest degree of efficiency its early use is *imperative*. A large percentage of postoperative radiation, is deferred weeks or months after metastasis has appeared. The most favorable time for application is *immediately* subsequent to operation. Another requirement must be kept in view, namely, crossfire with radium, which greatly enhances its power, when anatomically possible. Not infrequently burying radium in malignant structures or placing it in the vagina is of the highest importance. In uterine cancer I have so used it continuously for a period of ninety-six hours.

The following cases are quotations from the article in *Surgery, Gynecology and Obstetrics*, before noted.

“Freund, Heubel, Krönig, Veit, and others positively believe in a distant action of radium. The latter may be explained by the action of antibodies formed in the primary tumors by the action of the radium. They become absorbed by the blood streams to which they are carried to the deep lying foci and metastases where they act in a chemical manner. Prophylactic raying after operation to prevent recurrence is recommended by all the writers in this field. Gauss reports twenty-one such cases, twenty of which have remained free of recurrences up to six years postoperative, while the usual percentage of recurrences after operation without radiologic treat-

ment is sixty during the first year following the operation. (*Strahlen Therap.*, iii, Part ii, 388.)

"Sigwart describes a case of inoperable uterine cancer in which a bulbous edema of the entire base of the bladder disappeared after radium and mesothorium treatment. The carcinomatous cervix resumed its normal state, and the case became operable. The disappearance of the bulbous edema should prove the retrogression of the cancer." The opinions of the treatment and its indications, reported by various authors will shed light on the value of radiographic treatment of cancer of the uterus."

"Krönig mentions a case of absolutely inoperable cancer in a woman who entered his clinic over two years ago in a desperate condition. She has not had any treatment for the last eighteen months, she has gained 30 pounds in weight, and has so far had no recurrences. Krönig says he has had twenty-seven cases of inoperable cancer of the uterus with a dissemination into the broad ligament, but without any metastases. These cases have been free from recurrences from six to fourteen months, and the patients have no subjective disturbances. Krönig is hopeful that some of these cases will not recur. Radium therapy is especially successful in inoperable cases. Krönig rayed seven such cases—all of them treated over six months ago. They have so far remained free from recurrences while of three other cases which were subjected to radical operation without subsequent prophylactic raying, one case has already had a recurrence. Krönig is inclined to believe that operable cases in particular should be subjected to the radium treatment, as the surgical treatment of cases of the genital organs show such bad results. Recurrences are much less amenable to radium therapy than primary cancer; however, prophylactic raying after radical operations are remarkably successful. Krönig has twenty cases which were rayed after a radical operation; seventeen of these cases have been discharged from eighteen to thirty-six months ago; nineteen cases have remained free from any recurrences. If we consider that a recurrence after a surgical operation occurs under usual conditions within one year in 60 per cent. of the cases, then we must call the results above remarkable at least." (*Die Strahlen Therapie in der Gynaecologie Foertsche*, iii, e, 429 and *Zentrabl. f. Gynäk.*, 1914, 405, p. 153.)

"Bumm is of the opinion that radiotherapy produces in inoperable cases an improvement, in operable cases a positive local cure. During the last year he has been using prophylactic raying after every

radical operation—so far with good results.” (*Berl. Klin. Wchnschr.*, 1913, No. 22, 2001.)

“During 1913 Doderlein treated 153 cases of uterine cancer. Thirty-one of these cases are clinically well. Of these thirty-one cases twelve were inoperable. Twenty-four cases have died, ninety-three are still under treatment and eleven have been discharged.” (*München. Med. Wchnschr.*, 1913, No. 33, p. 1859.)

“Kroemer treated twenty-six cases of cancer of the genital organs. Of these four died and seventeen were improved or are free from any disturbances.” (*Strahlen Therapy*, iii, Part i, 224.)

“Nahmmacher deduces that operable tumors must be operated upon unless the operation is refused, and the operation must be followed by prophylactic radium treatment. Inoperable tumors must be rayed immediately.” (*Strahlen Therap.*, iv, p. 109.)

“Foveau de Courmelles states that radium and x-ray should not be regarded as antagonistic to surgery but as an accessory means. All operations for cancer should be followed by prophylactic radium and x-ray applications.” (*J. de Physio Therap.*, ii, p. 465.)

Schmidz says, in summing up, that radial therapy is indicated “(1) In inoperable cancers of the uterus, vulva and vagina; (2) in operable cases where operation is refused or is otherwise impossible.”

Perhaps no more authoritative and impressive statement has been spoken than the following on “Prophylactic Radiation” which appears in the annual report of the Radium Institute of London—which is noted for its splendid equipment, the high professional standing of the surgeons making up its directory, with its moderate and conservative views.

“During the year 1914 the number of patients was 841. There were no selected cases and radium is never used but in inoperable cases excepting those who refuse operation, where radium is used as a last resort. Since the opening of the Institute in 1911 numerous patients who have undergone operation for malignant diseases have received postoperative prophylactic irradiation. It would be exceedingly difficult if not impossible to make any statement as to the precise value of radium treatment on preventing or minimizing the danger of recurrence, but as the majority of these cases have suffered from severe and extensive and rapidly progressing malignant disease and the operators had expressed grave doubt of the possibility of remaining free from the disease for more than a few months, the relatively slight proportion of recurrences so far recorded (19 per cent.) does much to justify routine postoperative radiation. It should prove of special service in these malignant growths, in which

it was found impossible to operate well beyond the appreciable area of the disease."

"Uterine cancer continues to yield most gratifying results, and the effect of radium therapy in inoperable cases are far in advance of those obtained by any other known medical or surgical methods. The local manifestations of the disease are benefitted in the most striking fashion, and complete disappearance of fungating growths, arrest of hemorrhage and discharge, healing of ulceration, and relief of pain are phenomena of frequent occurrence. Great care must be exercised of recurrences which make their appearance within six months after the performance of a Wertheim operation. The function of the trophic nerves of the pelvis seems to be impaired seriously, and the amount of radium used should not exceed 50 milligrams. Detailed reports of four cases are given—two of which are mentioned. In the first case induration and ulceration disappeared and the patient has since that time seemed well. In the second case ulceration healed, the patient regained health with increase of weight. In the two other recurrent cases—both inoperable—the first after interval of radium treatment from December, 1913, to May, 1914, vaginal discharge ceased, bladder symptoms disappeared, she gained weight and was in good health. The other case was not cured but fibrosis had seemingly arrested the disease. The number of cases of cancer of the breast appearing for treatment far exceeds that of any other malignant condition. The policy of declining to treat operable cases is adhered to, unless patients have absolutely refused operation, and radium is used as a last resort. The progress of slow inoperable cases of the atrophic type is usually much relieved by radium. In rapidly growing cancer of the medullary type radium is not effective save to relieve pain. Nine cases are reported—all but one recurrent. In six of the recurrent cases treated by radium for various periods of time, there was substantial disappearance of the disease and partial restoration to health. One other had freedom from pain, gained in weight, became able to enjoy life and attend social functions; in another general health improved, ulcerations much healed, gaining in weight, and in better health than for years. In the last, while some glands remained enlarged, the patient's health was good." (Want of space renders further detail impracticable.)

A case of mammary epithelioma, right side. Mrs. S., widow, aged eighty years, came under my care December 22, 1914. Nipple and subjacent structures destroyed, with ulcer $1\frac{1}{4}$ inches in diameter, of about two years' standing. Up to March, 1915, she had received at intervals 550 milligram hours of radium treatment.

The ulcer had healed. A little induration remained at upper and inner quadrant of breast due to scar following abscess in her early married life. A specimen was taken for pathological examination which confirmed the diagnosis. Added interest attaches to this case from the fact that it was seen and treated before metastasis appeared. At this time, June, 1915, she is in excellent health.

Cancer of the vagina, clitoris, and labia yield to radium rather reluctantly, as is true of all mucous surfaces. It is oftentimes well to subject such growths to the influence of heat by the thermocautery and follow with radium. The bladder and rectum, so contiguous to the uterus with or without involvement of that organ or vagina are within the domain of the gynecologist, as are the uterine adnexa. The following case is in point. Adenocarcinoma of the rectum.

Miss B., aged fifty. She had suffered from rectal hemorrhages for years but had refused examination. She was anemic and debilitated from loss of blood and had great vesical irritability. This was reflex from a rectal growth, which was removed on her entrance to the Long Island College Hospital, and reported by the pathologist as adenocarcinoma. No hemorrhage. Commencing treatment on September 21, directly after the operation I gave her six radium treatments between that date and October 23, in doses of 50 to 100 milligrams. There was induration at seat of cancer $2\frac{1}{2}$ inches above the sphincter, posteriorly, which had extended to the left, involving more than one-half of the circumference of the gut. The radium was divided into two parts, one being placed in the rectum, and the other in the vagina, being in close proximity to each other, so as to secure the advantages of crossfire, thereby greatly augmenting its efficacy. On examination one week later there was absence by touch of infiltrated area. She returned to her home in Vermont apparently well. The vesical irritability disappeared altogether before treatment ceased. Early in May she was in excellent health, and examination showed no evidence of recurrence.*

Not alone in malignancy has radium a field of application in gynecological practice. Its power to control uterine hemorrhage is worthy of trial and consideration. Later it is my purpose to report my experience.

Kelly and Burnham in a recent article (*Jour. A. M. A.*) assert the efficacy of radium in several varieties of uterine hemorrhages of diverse pathogenesis not due to malignancy, pregnancy, or inflammation of the adnexa. First, myopathia hemorrhagica, with almost no pathological findings; second, bleeding in young girls; third, polypoid endometritis; fourth, myoma causing hemorrhage from

* From *N. Y. Med. Jour.*, Jan. 9, 1915.

pressure. In most instances the application is preceded by curettage and free cervical dilatation, and applying the radium within the uterine cervical canal. In fibroids, the ovaries, not the uterus, are the points attacked.

Without attempting a résumé of the several features under discussion, particular emphasis should be given to prophylactic and postoperative radiation. Its analgesic influence in affording palliation and sometimes a controlling influence over pain with avoidance of perturbing opiates, is one of its most precious properties, almost unknown and little appreciated. Insistence on the utility of cross-fire frequently by burying the radium in malignant growths has too long been neglected.

The writer is impressed with the belief that too little attention is paid to the general health and the hygienic surroundings of the patient. Finally, as in surgery, so in radium, disappointments are and must be encountered, and caution should be exercised in making promises as to results.

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THE TREATMENT OF ADVANCED CARCINOMA OF THE CERVIX WITH RADIUM.¹

BY

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My experience to date comprises five cases. As a result of the treatment, in two the subjective and objective symptoms have almost entirely disappeared; two are very much relieved; one has been failing in health. All the cases are still under observation. All but one are recent.

The first, and much the oldest case, had so many interesting and striking features, that I venture to present it in detail.

This patient, a woman of sixty-one, consulted me in August, 1912, and at that time presented the usual symptoms of an advanced carcinoma of the cervix, extended to the posterior vaginal fornix, and hopeless from the standpoint of a radical cure. I advised the customary procedure of curetment and cauterization which was carried out on the following day. The patient after recovering from a sharp attack of ether pneumonia, went to the home of her sister in a neighboring town, and there was treated with applications of acetone. Her condition steadily grew worse. The discharge became profuse and extremely offensive; she lost strength and weight, and became bed-ridden.

¹ Read at a meeting of the Philadelphia Obstetrical Society, February 4, 1915.

In December of that year (1912), Dr. John G. Clark and his staff visited Dr. Howard Kelly in Baltimore who told us of his investigations of radium, and spoke hopefully of what it promised in the treatment of inoperable cancer. The point that impressed us as of great practical moment, was that radium had an emanation which could be compressed into a glass capsule, and had the same therapeutic power, though to a less degree as radium itself. It was therefore possible to treat patients with radium, even at a distance from the supply.

The patient I speak of was so far gone that it did not occur to me to use the emanation in her case, but my assistant, Dr. Spaeth, wished to try it, and in this desire he was enthusiastically supported by one of the patient's sisters.

The first application of the radium emanation was made on the 29th of January, 1913, almost four months after the curetment. The day before, the patient had suffered from an uremic attack, and her condition appeared critical. The family physician advised giving her morphia and letting her die in peace. She was septic, 35 pounds below weight, had an extreme degree of anemia, and appeared on the verge of dissolution. One member of the family was extremely adverse to the use of the radium thinking that some extra torture was to be inflicted upon her mother, and it was only after I had exhibited the tiny luminous capsule to her and explained that all we wished to do was to place it in the carcinomatous area, that she gave her consent.

A second emanation was used on the 9th of February, and on the 28th of February, about 100 mg. of radium sent up from Baltimore was placed in the carcinomatous area.

Almost from the beginning of the treatment, the patient had shown signs of improvement, and within ten days of the first application of the emanation, the odor had diminished very considerably. At the time when the radium was used, an examination showed dense infiltration of both the rectovaginal and the vesicovaginal walls, and considerable infiltration into the bases of the broad ligaments. There was no indication of neighboring or remote glandular involvement or metastases. The radium was left in place two days and three nights. Thereafter the patient experienced severe vesical and rectal tenesmus which lasted two or three weeks. Her condition aside from this seemed to gradually improve, and has continued so until the present time. I saw the patient last on the 5th of May, 1914, nearly a year ago, and at that time the blood was normal, she had gained 35 pounds, she had no pain, there was no discharge from the carcinomatous area, the rectovesical and the vesicovaginal fistula were nearly closed, and upon digital and visual examination of the area, no evidence of carcinoma could be seen or felt; the tissues were soft and pliable, and to all intents and purposes, the disease had disappeared. The patient still continues to do well, she is gaining in weight and strength, does her own housework, and feels that she has been given a new lease of life.

The second patient, aged sixty-two, was curetted and cauterized

on the 27th of July, 1914. This patient lives in a neighboring city. She came to Philadelphia on two subsequent occasions and had an application of about 25 mg. of radium over night. After the second application she failed rapidly in health, and died in a few months.

The third patient was a woman forty-four years old; curetment and cauterization was performed August 26, 1914. The case was one of hopeless carcinoma of the cervix. The patient has had three applications of radium. At present she feels and looks perfectly well. It has been hard to persuade her that she still requires treatment. She has no symptoms, no bleeding, no discharge, but there are still some slight evidences of the carcinomatous disease in the neighborhood of the cervix.

The fourth patient, aged thirty-seven, was operated upon the 9th of October, 1914. She had two treatments with radium; one on November 11, and one on December 29. At the present time there is practically no macroscopic evidence of the trouble. The uterus is freely movable, the carcinomatous area is covered with healthy mucosa, and she has absolutely no symptoms. The improvement in her general health is quite remarkable. At the time of her admission to the hospital, social service workers expecting her to die, had her children admitted to an institution for the care of the destitute. The patient is now having some trouble in having them returned.

The fifth patient was a woman twenty-eight years old, upon whom I operated October 14, 1914. She came to the hospital for the cure of a complete tear of the perineum. The carcinoma of the cervix, which was advanced, had not been suspected. She attributed all her symptoms to the tear. This woman has had two treatments since. Her general condition has improved very much, she has no symptoms whatever, and the carcinomatous area has shrunk so as to be almost unrecognizable.

It is scarcely necessary for me to report that there have been many instances of complete cessation of objective and subjective symptoms of carcinoma following treatment with radium, or mesothorium, or the x-ray, or all combined. The reports of Krönig and Gauss, Döderlein, Bumm and Voigt, Schauta, Wertheim, Cheron and Duval, Pinch, and others, prove that radium has a distinct and positive influence upon carcinoma cells. It would appear that exposure to the influence of the gamma rays causes the cells to shrink and finally to disappear. Whether they completely disappear depends upon the virulence of the individual growth, the length of exposure to the rays, the amount of radium that is used, and possibly to the individual resistance of the patient.

It is pretty generally agreed that radium itself is more effectual than mesothorium, and that the filtered rays are therapeutically an im-

provement on the unfiltered rays. The radium must be used in large dose, and the salt must be placed in immediate contact with the carcinomatous area. It is almost universally agreed that it is a great advantage to combine the use of radium with deep x -ray treatment, and this we are now doing with the three cases which are still under active observation at the University Hospital.

In summarizing the conclusions which I have drawn from this study, I may say:

First, that treatment by radium must be reserved for those cases of carcinoma of the cervix in which removal by operation is out of the question; it is certainly unwise to depend upon the use of radium alone. Nothing can take the place of operation in an early case. Radium must be used as far as possible in every postoperative case to prevent recurrence. In those unfortunate instances in which the disease has advanced beyond the possibility of radical surgical treatment, radium will cure a percentage not yet determined, and will give the stricken people formerly condemned to die, a new hope.

Second, the therapeutic effect of radium is probably analogous to the therapeutic effect of the x -ray. Only in radium we have a substance which can be placed directly in the diseased area, overcoming in this way some of the mechanical difficulties encountered with the x -ray in the treatment of cervical carcinoma. Radium will probably prove to be as effectual against certain advanced cancers of the cervix as the x -ray has been curative in certain malignant growths of the skin. The case particularly suitable to such treatment is cancer of the squamous type which is moderately destructive and invasive, and in which there are no metastases or deep extensions.

Third, with few exceptions up to the present time, radium has not been used properly. It must be exhibited in massive dose, and the case must be kept under observation until the local subjective and objective symptoms have disappeared. The difficulties in carrying out these recommendations are the enormous cost of radium, the limitations of its supply, and the lack of hospital facilities.

Fourth, in order to avoid deception in regard to radium treatment of all sorts, the collections of radium should be limited to hospitals and public institutions, and the existence of all radium supplies should be registered in the Department of Public Health, so that fraudulent advertisers and sham preparations of radium can be apprehended.

A STUDY OF THE SPECIFICITY OF FERMENTS IN PREGNANCY AND THE MECHANISM OF THE ABDERHALDEN REACTION.
SERUM STUDIES IN PREGNANCY, II.*

BY

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ASIDE from the probable clinical value of the methods devised by Abderhalden in the serum diagnosis of pregnancy and various pathological conditions as malignancy, tuberculosis, lesions of the nervous system and ductless glands, most interest concerns the question of the specificity of the ferments or antibodies concerned and the mechanism of their action.

While Abderhalden and many of his pupils have claimed a high degree of specificity for the "protective ferments" and his pregnancy reaction, claiming from the beginning that errors of technic were largely responsible for the failure of others to obtain satisfactory results, the dialysis test as now conducted is not especially difficult and sufficient work has been done by other investigators who have followed Abderhalden's technic with great care and exactness to give warrant to the claim that other factors aside from those purely technical may be responsible for the divergent and nonspecific results obtained.

As is well known Abderhalden bases his theory concerning the "protective ferments" upon the specific digestion of a substrat by specific ferments, claiming that these ferments are separate and distinct antibodies and not to be classed with the cytolytic amboceptors or cytolsins of Ehrlich.

That the substrat in the pregnancy test is a boiled tissue would seem to impair the specificity of the reaction and indeed certain physical factors as the mechanical state of division of the substrat and its facility for acting as an absorbent in a purely mechanical capacity likewise appear to be factors in the reaction on the basis of numerous investigations showing that loose areolar placental tissue

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is frequently digested by normal sera and various pathological sera irrespective of pregnancy, whereas digestion of a firm and compact tissue as that of malignant tumors is much less constant. In this connection the work of de Waele(1) has a bearing inasmuch as he found that any agent which would cause an alteration of the physical state of the serum globulins would cause an intense Abderhalden reaction, concluding that the reaction depended upon a globulinolysis having an origin in physical processes probably analogous to the precipitin reaction.

While immunological as well as chemical and physical reactions are more or less dependent upon quantitative factors, recent investigations by Flatow(2) and Herzfeld,(3) Plaut(4) and others show that while specific results may be obtained by proper manipulation of the material, nonspecific results in either a negative or positive reaction may be obtained with practically any serum, however well controlled, with the same material. These investigations are significant not so much because of quantitative factors alone as they are by reason of indicating that the pregnancy reaction is dependent upon the principles of mechanical absorption on the part of the substrat of something from the serum followed by a digestive process, rather than upon the simple digestion of a specific substrat by a specific ferment.

For this conception of the mechanism of the Abderhalden reaction the investigations of Jobling and Petersen(5) have been fundamental and of great interest and importance. They have shown that the digestive power of a serum is dependent upon nonspecific proteolytic ferments or proteases normally present and held in check by an antiferment, which, according to their work, is believed to reside in the unsaturated fatty acids of the serum. Upon removal of the antiferment by means of lipoidal solvents or saturation with various organic and inorganic substances as boiled tissue, iodine, starch, kaolin and the like, protease activity is released followed by digestion not of the so-called substrat but of the protein of the serum. Likewise Plaut (6), Peiper (7), Friedman and Schonfield(8) and Bronfrenbrenner(9) have obtained positive Abderhalden reactions with guinea-pig and human sera not only with placental tissue but also with such inert substances as kaolin, starch, barium sulphate, chloroform, etc. These studies would, therefore, tend to show that the boiled placental tissue in Abderhalden's reaction is not digested but acts simply as an absorbent in a purely mechanical manner.

Furthermore Heilner and Petri(10) and de Waele(11) found the

ferments in the blood serum so quickly after the parenteral introduction of the protein, at intervals hardly sufficient for the elaboration of new and specific ferments as to support the theory that the ferments are preformed and that the substrat serves to activate these rather than bring about the production of new ferments.

Whether or not we regard Abderhalden's "protective ferments" in the serum of a pregnant animal as specific ferments or but an increase of normal and general proteolytic ferments, practically all investigators agree that they are to be found with regularity and in relatively large amounts in the serum during the later stages of pregnancy. Granting, therefore, that mobilization of proteolytic ferments occurs during pregnancy we(12) have sought during the past year to determine if extracts of placenta injected intracutaneously or applied to the skin of pregnant animals would be followed by a process of digestion and the train of phenomena generally recognized as a local anaphylactic or allergic reaction. With suitable material properly controlled it would appear reasonable to expect that a process of digestion would occur *in vivo* as occurs *in vitro* and that this process may be detected by local disturbances of an inflammatory character. With this in view we prepared a number of placental extracts or *placentins* by different methods and found that when injected intracutaneously in pregnant women well-marked local reactions characterized mainly by erythema and infiltration followed within twenty-four to forty-eight hours in the majority of instances. On the other hand the injection of these same extracts into our own skins and into other males and non-pregnant women who volunteered for the work, was followed in some instances by similar reactions usually of lesser degree. Control extracts of kidney (*nephrens*) also produced a small percentage of reactions in pregnant and nonpregnant women and men, but after considering and controlling the effects of trauma and especially the condition of peculiar hypersensitiveness (unstimmung) of the skin of pregnant women we were lead to conclude that an increase of proteolytic ferments occurred during pregnancy similar to those found in the normal serum of men and nonpregnant women which were mainly responsible for these allergic reactions.

EXPERIMENTAL PART.

These results induced us to continue the work and study the specificity of the ferments and the mechanism of their action along a similar line inasmuch as most of the previous investigations in

this subject were conducted after the dialysis method of Abderhalden, the occurrence and degree of digestion being determined by the ninhydrin test with the dialyzable products of protein digestion. Jobling and Petersen, however, have used another technic consisting in the removal of the anti ferment by lipoidal solvents or absorption by various organic and inorganic substances and studying the digestive activity and specificity of the proteolytic ferments by chemical methods.

As we had reason to believe in our previous investigation that proteotoxins were produced *in vivo* and that these were responsible for the local skin reactions, we have continued our work by bringing about proteotoxin production *in vitro* and testing for its presence in sera by means of local skin reactions and general intoxication following respectively the intracutaneous and intravenous injection of the material. By these methods the results of which are given in this communication we hope to bring forward additional information regarding the specificity of the ferments and the mechanism of their action.

This method of study is based upon the work of several investigators as Friedman(13) who produced a protein poison by digesting ox corpuscles with immune and normal rabbit serum; by Weichardt(14) as the result of the digestion of placental protein with rabbit immune serum and by Friedberger(15) who digested a serum precipitate with normal guinea-pig serum, the results of these investigations being similar to those of Vaughan and Wheeler,(16) who several years previously obtained toxic substances capable of producing symptoms and lesions analogous to acute anaphylaxis by splitting proteids of various origin with alcoholic sodium hydroxide solution. Subsequent studies by Friedberger and his collaborators(17, 18), by Dold and Aoki(19) and others have shown that similar protein poisons could be obtained by digesting various microorganisms with fresh normal guinea-pig serum, all of these investigators regarding the protein poison as derived from the protein antigen by means of a process of digestion.

As the effects of these protein poisons produced *in vitro* in the living animal were similar to the symptoms and lesions observed in acute anaphylaxis, Friedberger has called them anaphylatoxins and this term has come into such general use that it is applied to any poisonous protein substance able to produce in normal animals the phenomena of anaphylaxis. At present, however, we prefer to call this substance proteotoxin.

Briefly the objects of this investigation were as follows:

1. To determine by means of intracutaneous and intravenous injections of the material if proteotoxins are produced during the Abderhalden reaction.
2. To study the specificity of the ferment in pregnancy by the same methods.
3. To study the mechanism of the reaction and particularly the source of the protein matrix.
4. To study the relation of complement to the proteolytic ferments of pregnancy.

I. PROTEOTOXIN PRODUCTION IN A MIXTURE OF PREGNANCY SERUM AND PLACENTAL TISSUE.

Technic.—Sera were secured from pregnant women at or near term under strict aseptic precautions and from four to five hours after a meal. These sera were then thoroughly centrifugalized to render them corpuscle free and used within three hours after bleeding. Placental tissue was prepared as directed by Abderhalden. With each serum an Abderhalden reaction was conducted in the usual manner with tested and satisfactory shells in order to compare the effects of proteotoxin *in vivo* with the occurrence and degree of the ninhydrin test with the dialysates of the Abderhalden reactions.

For the production of proteotoxin, sterile sera were placed in sterile test-tubes with sterile placental tissue (boiled) in the proportion of 1 gram of tissue to 2 c.c. of serum. These proportions were varied, however, in order to study quantitative factors upon proteotoxin production. Mixtures of serum and placenta were then incubated at 37° C. for eighteen to twenty hours when they were thoroughly centrifugalized to remove all particles of placenta and the serum carefully pipeted off. At the same time ninhydrin tests were made of the dialysate in the Abderhalden reactions. Cultures were made to check the technic and particularly since the sera were injected intracutaneously and intravenously.

Proteotoxin production was tested by injecting intravenously varying amounts of serum into normal guinea-pigs of varying weights; also by the intracutaneous injection of serum into the skins of guinea-pigs and into ourselves, laboratory assistants and others who volunteered for the work.

The Abderhalden reactions were conducted after the dialysis method. All substrats were carefully prepared and only shells known by preliminary tests to be permeable to peptones and impermeable to whole protein were used. To 0.5 grams of substrat was added 1.5 c.c. serum and dialysis conducted in 20 c.c. sterile distilled water. As usual serum and substrat controls were set up with each serum and in every test.

General Reactions.—The results of the intravenous injection of sterile pregnancy sera incubated with sterile placental tissue for

eighteen hours followed by thorough centrifugalization is shown in the following Table.

TABLE I.—TOXICITY OF PREGNANCY SERA AFTER INCUBATION WITH PLACENTAL TISSUE.

Serum No.	Ninhydrin reaction*	Test-tube		Wt. of pig	Dose serum, c.c.	Results
		Gm. of placenta	Serum, c.c.			
1†	++++	3	6	630	4.0	Convulsions, died in two minutes.
2	++++	2	4	270	2.0	Very toxic, died in a few hours.
3	++++	4	12	350	3.5	Slightly toxic, recovered.
4	+++	4	6	470	1.0	No effect.
5	+++	3	7	210	2.4	No effect.
6	++++	2	4	300	2.5	Convulsions, died in two minutes.

These experiments showed that the Abderhalden reaction is accompanied by the formation of toxic products capable of producing acute intoxication of normal guinea-pigs. Of those animals showing evidences of intoxication as hiccough, frequent passage of feces, prostration and minor convulsions, blood coagulation was delayed; two pigs succumbing almost immediately after injection showed the typical extreme emphysema of the lungs characteristic of anaphylactic death in this animal.

With many sera we were impressed with the fact that marked physical changes had occurred as shown by an opalescent or decided milky condition of the serum even after thorough and prolonged centrifugalization. As will be pointed out later, these physical changes were less marked with other tissue substrats and indeed entirely lacking with sera treated with inorganic substances as kaolin and starch. Jobling, Eggstein and Petersen(20) have reported, however, that the placental tissue is not digested but instead have found an actual increased resistance of the placental tissue to enzyme action.

Local Skin Reactions.—The intracutaneous injection of these

* +++++ = strongly positive reaction (deep color).

+++ = moderately positive reaction.

++ = weakly positive reaction.

+ = weak or doubtfully positive reaction.

† Ninhydrin tests of dialysate of the serum controls were water clear with all sera except Nos. 3 and 5 which showed a faint violet tinge due to dialyzable substances in the sera.

sera into guinea-pigs was found to produce local changes characterized by edema and superficial necrosis, erythema being less easily appreciated. A number of these were also injected into the skins of persons who volunteered for the tests and in these the erythema and infiltration were better marked.

All injections were made with the usual precautions to insure sterility and by means of a fine (No. 26) needle. In the guinea-pig skin these injections are made with some difficulty as it is necessary to inject into the layers of the skin rather than subcutaneously. The reactions were read at the end of twenty-four and forty-eight hours.

In practically all instances the degree of local toxicity of a serum was parallel with its general toxicity as shown in Tables I and II, and likewise followed the degree of digestion as evidenced by the amount of dialyzable substances detected with the ninhydrin reagent.

TABLE II.—LOCAL SKIN REACTIONS SHOWING TOXICITY OF PREGNANCY SERA AFTER INCUBATION WITH PLACENTAL TISSUE.

Serum No.	Ninhydrin reaction	Test-tube		Amt. intra-cutaneously	Result
		Placenta, gm.	Serum, c.c.		
1	++++	3	6	0.05	Slight edema.
2	++++	2	4	0.1	Edema and superficial necrosis.
3	++++	4	12	0.1	Slight edema.
4	+++	4	6	0.1	Negative.
5	+++	3	7	0.2	Very slight edema.
6	++++	2	4	0.1	Well-marked edema.
7	++	4	8	0.05	Volunteer: erythema 1.5 × 2.5 cm., edema.
8	++++	3	7	0.05	Volunteer: faint erythema and slight edema.
9	+++	2	4	0.05	Volunteer: negative.
10	++++	1	3	0.05	Volunteer: erythema, 1 × 1.5 cm., slight edema.

Several of the guinea-pigs showing positive reactions were killed at forty-eight- and seventy-two-hour intervals and at autopsy the abdominal wall at the site of injection showed well-defined areas of gelatinous edema and acute congestion somewhat similar to the inflammatory edema produced by diphtheria toxin. One of our animals with a well-marked local reaction died in about seventy-two hours after injection.

The experiments having shown that human pregnancy serum

develops marked toxicity when treated with human placenta, it was necessary to control the results with intravenous and intracutaneous injections of pregnancy serum alone.

To this end fresh human pregnancy serum was injected intravenously into several normal pigs within a few hours after bleeding and also after the sterile serum had been placed in an incubator for eighteen hours. In no instance were there any evidences of toxicity of sterile human pregnancy serum for the normal guinea-pig, either in a fresh active state or after incubation.

Usually the intracutaneous injection of fresh pregnancy serum was without any effect whatsoever. If as much as 0.2 c.c. of fresh serum was injected strictly intracutaneously a small nodule with superficial necrosis of the epidermis not infrequently followed and this may be mistaken for an inflammatory reaction but with the injection of smaller amounts the chances of error were reduced to a minimum. A number of these injections are listed in Table III. Four intracutaneous injections of sterile pregnancy serum in dose of 0.05 c.c. both in fresh state and after incubation at 37° C. for eighteen hours into volunteers was followed by no disturbances in three persons and by a slight area of erythema with no appreciable edema in a fourth person. Regular Abderhalden reactions were conducted with these sera and the results with the serum controls shown in Table III, three of the nine sera showing in the dialysates the presence of minute amounts of ninhydrin reacting substances.

TABLE III.—STERILE PREGNANCY SERUM IS NOT TOXIC.

Serum No.	Ninhydrin reaction	Condition of serum	Dose intracutaneously	Local reaction	Wt. pig, gm.	Dose of serum intravenously, c.c.	General reaction
1	—	Incubated.	0.1	Negative.	210	2.8	Negative.
2	—	Fresh.	0.05	Negative.	300	2.5	Negative.
3	±	Incubated.	0.2	Small nodule.	250	3.0	Negative.
4	±	Incubated.	0.1	Negative.	450	3.8	Negative.
5	—	Fresh.	0.2	Small nodule.			
6	—	Incubated.	0.05	Volunteer: faint erythema.			
7	±	Fresh.	0.05	Volunteer: negative.			
8	—	Fresh.	0.05	Volunteer: negative.			
9	—	Incubated.	0.05	Volunteer: negative.			

The Toxicity of the Dialysate in the Abderhalden Reaction.—The intravenous and intracutaneous injection of sera taken from the dialyzing shell at the completion of the Abderhalden reaction (twenty hours at 37° C.) and thoroughly centrifuged showed that toxic substances were still present although usually diminished as compared with the same sera treated with placenta in test-tubes in the same proportions.

For these experiments dialyzing shells were usually loaded with three to four times the usual amounts of placental tissue and serum and dialyzed against 20 to 30 c.c. of sterile distilled water. After twenty hours a ninhydrin test was conducted with 2 c.c. of the dialysate and the balance evaporated to one-third its original volume under sterile conditions.

The toxicity of these concentrated dialysates were then tested by a number of intravenous and intracutaneous injections in guinea-pigs. In most instances the results were negative. As shown in Table IV two animals showed slight edema at the point of injection of 0.2 c.c. and one animal was rendered slightly toxic by the intravenous injection of 6 c.c.

TABLE IV.—THE LOCAL AND GENERAL EFFECTS OF THE CONCENTRATED DIALYSATES OF THE ABDERHALDEN REACTION.

No.	Ninhydrin reaction	Dose intracutaneously	Local reaction	Wt. pig. gm.	Dose injected intravenously, c.c.	General reaction
1	++++	0.05	Negative.	300	6.0	Negative.
2	++++	0.2	Slight edema.	450	7.0	Slightly toxic, recovered.
3	+++	0.1	Negative.	400	5.0	Negative.
4	++++	0.3	Negative.	370	3.5	Negative.

Intracutaneous injections of 0.05 to 0.1 c.c. of two of the concentrated dialysates into our own arms and those of six volunteers were followed by small areas of erythema in three instances.

These results would tend to show that the major portion of the toxic protein substances formed during the Abderhalden reaction do not dialyze through the shells ordinarily used in the usual interval of eighteen to twenty hours, although these dialyzable and ninhydrin reacting substances are somewhat toxic and probably a portion of the proteotoxic substances produced. On the other hand, they may represent cleavage products broken down beyond the

stage at which they possess toxicity although still capable of giving the color reactions (ninhydrin and biuret).

Nontoxicity of Placental Peptone.—As the dialyzable substances in the Abderhalden reaction are regarded largely as of the nature of peptones, amino-acids and other products of protein digestion, it is of interest to note that the intracutaneous injection of 0.1 c.c. of a 1 per cent. solution of placental peptone (Farbwerke-Hoechst Company) in normal salt solution and filtered through a sterile Berkefeld filter, was without any effect whatsoever being nonirritant and if seized upon and digested in the skin left no evidences of this in the form of a local reaction.

These results in addition to those observed with concentrated dialysates tend to show that a portion, at least, of the toxic products of protein digestion are not dialyzable through tested shells in the usual period of the Abderhalden reaction.

Toxicity of the Serum in the Abderhalden Reaction is Increased with Reincubation.—When pregnancy serum is removed from placenta after a period of eighteen hours in the incubator by thorough centrifugalization and is reincubated at 37° C. for another period of twelve to eighteen hours, toxicity is frequently appreciably increased as determined by intracutaneous and intravenous injections of the serum. As to the nature of the changes which may have taken place in the serum, our later experiments with inert substances as kaolin and starch show that the placental tissue probably deprives the serum of an antiferment and that reincubation at 37° C. is followed by further autodigestion of the protein of the serum.

Among four controls consisting of sterile pregnancy sera alone incubated for thirty-six to forty-eight hours and injected intracutaneously and intravenously one developed an appreciable toxicity for the guinea-pig for the intravenous injection of 3.5 c.c. in a 280-gram animal was followed by prostration, lessened coagulation time of the blood and muscular twitchings with ultimate recovery.

Proteotoxin Production in Human Pregnancy Serum With Non-specific Tissue Substrats.—In order to test the specificity of the ferments in human pregnancy serum by the methods we were employing an extended series of experiments were conducted consisting in incubating sterile human pregnancy serum with various sterile substrats other than placental tissue, as human kidney, sheep liver, dog liver and sheep muscle. These substrats were prepared in the same manner as placenta for the Abderhalden reaction and briefly boiled once more prior to the experiment in order to insure sterility.

Fresh, sterile, corpuscle-free pregnancy serum was added to the various substrats in sterile test-tubes in the same proportion as stated under previous experiments and incubated for eighteen hours. At this time the tubes were thoroughly centrifuged in order to remove all particles of tissue and a portion of serum used for intracutaneous and intravenous injection while a second portion was reincubated in sterile test-tubes and tested sixteen hours later by the same methods.

At the same time regular Abderhalden reactions were set up with each serum and substrat and ninhydrin tests of the dialysates made eighteen hours later.

Except when a substrat of human kidney was used the degree of toxicity of the sera as shown by the intracutaneous and intravenous injection of the material was either less than that shown with placental tissue or entirely absent. Likewise while the Abderhalden reactions showed some dialyzable substances in the dialyzates the amounts were less than occurred when placental tissue was used. In these tests, however, human kidney frequently showed reactions of equal density and the sera were found regularly toxic for animals. The results of a single set of these experiments are shown in Table V.

TABLE V.—PROTEOTOXIN PRODUCTION IN HUMAN PREGNANCY SERUM WITH NONSPECIFIC TISSUE SUBSTRATS.

Serum No.	Substrat	Ninhydrin reaction	Local reactions		General reactions		
			Injected	Result	Wt. pig	Amount injected	Result
16	Placenta.	++++ *	0.1	Positive.	350	4 c.c.	Convulsions, died in two minutes.
16	Human kidney.	+++	0.1	Positive.	410	4.5 c.c.	Convulsions, died in a few minutes.
16	Dog kidney.	+	0.1	Negative.	380	4 c.c.	Negative.
16	Sheep liver.	+ to ++	0.1	Negative.	325	3.2 c.c.	Negative.
16	Dog liver.	++	0.1	Negative.	300	3 c.c.	Very slightly toxic, recovered.
16	Sheep muscle.	±	0.1	Negative.	410	4.8 c.c.	Negative.
16	Human liver.	+	0.1	Very slight edema.	500	5.4 c.c.	Slightly toxic, recovered.

* Serum control of this particular serum showed a very faint violet color.

All of these substrats were used several times with several different pregnancy sera and while the results with all except human

kidney were generally negative in several instances small amounts of toxic substances could be detected, especially after the period of reincubation and when the sera were injected in doses of 0.05 c.c. in the skin of our arms and those who volunteered for the tests. Intracutaneous injections into guinea-pigs did not appear to constitute as delicate a reaction and the intravenous injection of sera corresponding in amount to a cubic centimeter or more for each 100 grams of weight failed to detect toxicity in sera showing slight local disturbances when injected into our own skins. In our experiments, therefore, toxic substances were regularly produced in mixtures of human pregnancy sera and placenta and human kidney and only occasionally with the other tissue substrats from the lower animals mentioned.

Proteotoxin Formation in Human Pregnancy Serum with Inorganic Substrats.—We have treated human pregnancy serum with various inorganic substances including sterile kaolin, starch, agar and powdered quartz sand and tested the sera according to our methods after eighteen hours' incubation and again after these sera had been freed of the absorbent by thorough and prolonged centrifugalization and reincubated for another period of sixteen to eighteen hours.

At the same time regular Abderhalden reactions were conducted with 1.5 c.c. of each serum and 0.2 gram of each of the absorbents. Particular care was exercised in having the serum and absorbent well mixed by means of gentle stirring with a sterile rod.

TABLE VI.—PROTEOTOXIN FORMATION IN HUMAN PREGNANCY SERUM WITH INORGANIC ADSORBENTS.

Serum No.	Adsorbent	Ninhydrin test	Local reaction		Wt. pig	General reaction	
			Dose	Result		Dose	Result
18	Kaolin.	—	0.05	Negative.	400	4.2 c.c.	Negative.
18	Starch.	±	0.05	Negative.	510	5.0 c.c.	Negative.
18	Agar.	+	0.05	Faint erythema.	385	4.0 c.c.	Slightly toxic, recovered.
18	Quartz.	±	0.05	Negative.	0	0	0
19	Kaolin.	±	0.05	Faint erythema.	280	2.8 c.c.	Toxic, died during night.
19	Starch.	++	0.05	Erythema. 1.5 × 1 cm.	300	1.8 c.c.	Slightly toxic; recovered.
19	Agar.	++	0.05	Negative.	0	0	0
19	Quartz.	±	0.05	Negative.	0	0	0

Ninhydrin test of serum control dialysate of serum No. 18 was water clear; of serum No. 19 a faint violet color.

In the test-tube the proportions of serum and adsorbent were 0.1 to 0.2 gram adsorbent to each cubic centimeter of serum.

The results of two sets of these experiments with two different sera are shown in Table VI. The injections were of sera removed from the adsorbents after eighteen hours' incubation at 37° C.

The local reactions listed are those observed twenty-four hours after the intracutaneous injection of 0.05 c.c. of the sera into the arms of volunteers and ourselves. A number of injections of 0.1 c.c. into the abdominal skin of guinea-pigs yielded negative or at most inconclusive results.

After reincubation of the sera alone for a second period of sixteen hours an increase in toxicity was apparent in several instances but in the majority the injections were purely traumatic or clearly negative. In one instance where marked intracutaneous and general reactions were observed in guinea-pigs the serum was found contaminated with bacteria and special precautions against contamination were necessary.

We must also record the observation that these sera were usually quite clear or at most but slightly opalescent after separation from the adsorbents, an appearance quite in contrast to the opacity and milkiness of sera digested with placental or human kidney tissue.

The results of these experiments showed that when inert substances as kaolin, starch and powdered quartz are added to human pregnancy serum and the mixtures are incubated for sixteen to eighteen hours toxic substances are produced but that these are either much less in amount than that formed in the presence of placental tissue or else they are not toxic for the human skin or guinea-pig. In view of the results of our experiments previously given, the latter assumption has no weight. We believe that thorough centrifugalization of the sera removed all particles of the adsorbents used; the starch mixtures, however, were somewhat more troublesome in this respect.

Of these adsorbents agar rendered more toxic sera yielding positive cutaneous reactions than kaolin or quartz and starch came second in the number of sera rendered toxic; in the former protein substances in the agar may have aided in the processes of proteotoxin production and in the latter minute particles of starch in a colloidal state of division may have aided in producing local reactions in a traumatic manner.

Proteotoxin Formation in Human Male Serum with Placental Tissue.—As controls in the work and for the purpose of studying the

specificity of ferments in pregnancy serum, a similar series of experiments were conducted with fresh male serum using placental tissue as well as other tissue substrats and the inorganic substances as kaolin, quartz, etc.

These experiments were conducted in exactly the same manner as those already described. Usually in every experiment with pregnancy serum a male serum was used at the same time, with the same substrats or adsorbents and tested for toxicity by intracutaneous and intravenous injection in the same manner. Abderhalden reactions were set up at the same time and the dialysates tested with ninhydrin. In this manner we were able to compare the toxicity of the sera by intracutaneous and intravenous injection with the occurrence and degree of protein digestion as shown in the ninhydrin reaction.

Sera were usually obtained by securing blood from the veins of healthy male assistants in the laboratory and from our arms, all bleedings being conducted in such a manner as to insure sterile products. As with the pregnancy sera these were used within three hours after collection and their toxicity tested after eighteen hours incubation with the substrats or adsorbents and again after reincubation for sixteen hours following removal of the adsorbent by prolonged centrifugalization.

The results of some of these experiments are shown in Table VII where the results of the Abderhalden reactions and the local and general reactions of sera after primary and secondary incubation are shown in parallel columns.

Briefly, the results were somewhat similar to those observed with the pregnancy sera. Of the tissue absorbents or substrats toxicity formation was most apparent with kidney and placenta whereas with other tissues as dog liver and sheep liver toxicity was not apparent or present in but slight degree.

The sera of healthy males, however, contain ferments which when released bring about protein digestion and the formation of proteotoxins and while this phenomena was most marked with tissue substrats it also occurred occasionally and to a slight degree with kaolin and agar.

Practically all of these sera were tested for toxicity for the guinea-pig without the addition of any adsorbent. Fresh male serum is not toxic for this animal either by intracutaneous or intravenous injection although of six sterile sera incubated at 37° C. for thirty-six hours, one produced edema upon intracutaneous injection and

TABLE VII.—PROTEOTOXIN PRODUCTION IN MALE SERUM WITH VARIOUS ORGANIC AND INORGANIC SUBSTRATS OR ADSORBENTS.

Serum No.	Adsorbent	Ninhydrin reaction	Local reactions		After reincubation, sixteen hr.	General reaction after eighteen hr.			Result
			Dose	After eighteen hours		Wt. pig	Dose	Result	
1	Placenta.	+	0.2	Slightly positive.	Positive.	530	4.0	Died over night.	Died over night.
2	Human kidney.	+ ⁴	0.2	Marked positive.	Positive.	410	4.0	Toxic, recovered.	Convulsions, recovered.
2	Placenta.	+	0.2	Negative.	Slightly positive.	430	4.0	Negative.	Very slightly toxic.
2	Human kidney.	+ ⁴	0.2	Negative.	Marked edema.	430	4.0	Convulsions, recovered	Died in two minutes.
3	Placenta.	±	0.1	Negative.	Slight edema.	400	2.0	Negative.	0
4	Placenta.	—	0.2	Negative.	Negative.	0	0	0	Convulsions, recovered.
4	Human kidney.	+	0.2	Negative.	Very slight edema.	0	0	0	Convulsions, died in thirty-six hours.
5	Placenta.	±	0.05	Negative.	Positive.	560	0.8	Negative.	Negative.
6	Placenta.	+ ²	0.05	Negative.	Negative.				
6	Human kidney.	+ ²	0.05	Erythema 1.5 X 2 cm.	Same.				
6	Dog liver.	+	0.05	Negative.	Negative.				
6	Sheep liver.	+	0.05	Negative.	Negative.				
7	Placenta.	+ ²	0.05	Erythema 2 X 2.5 cm.	Same.				
7	Placenta.	+ ²	0.2	Slight edema.	0				
7	Human kidney.	+ ²	0.2	Edema.	0				
7	Kiölin.	—	0.05	Negative.	Negative.				
7	Starch.	—	0.05	Negative.	Negative.				
7	Agar.	+	0.05	Slight erythema.	Erythema.				
8	Kiölin.	±	0.05	Faint erythema.	Same.				
8	Starch.	±	0.05	Negative.	Negative.				
8	Agar.	+	0.05	Faint erythema.	Erythema.				

* Ninhydrin tests with dialysates of sera 1, 2, 3 and 8 were water clear; with sera 4, 5, 6, 7 a faint violet.

All intracutaneous injections with dosage of 0.05 c.c. were into the arms of volunteers and ourselves; all others into the abdominal skins of guinea-pigs.

3.5 c.c. injected intravenously into a 380-gram pig was followed by convulsion and death a few hours later.

The Relation of Complement to Proteotoxin Production in Vitro.—The relation of complement to the mechanism of the Abderhalden reaction has attracted considerable attention mainly in attempts to establish the identity of the "protective ferments" with the cytolytic amboceptors of Ehrlich. Williams and Pearce(21) found that inactivation of a pregnancy serum impaired but did not entirely remove its digestive capacity and Lange(22) and others have recorded similar observations. The experiments of Stephan(23), Hauptmann(24), Bettencourt and Menezes(25) and Steising(26), however, seem to show a relationship of complement to the Abderhalden reaction inasmuch as the addition of the serum complements of the guinea-pig, rabbit or human male seem to reactivate a serum inactivated by heating at 56° C. for half an hour. Jobling, Eggstein and Petersen(27) have shown that serum complement and normal proteolytic ferments are not identical and that while the former may be inactivated by heating at 56° C. for half an hour the latter are more resistant, the results observed following the addition of serum complement to inactivated pregnancy serum being ascribed to the amounts of nonspecific protease thereby added.

Abderhalden has found that the addition of a serum complement appears to play a part in the mechanism of the reaction but hopes to find an explanation that would remove the relation from the realm of the side-chain theory of Ehrlich. The explanation offered by Jobling and his colleagues would appear to be satisfactory and is based upon experimental evidence.

In a series of experiments we have digested pregnancy and male sera with human placenta, human kidney, sheep liver and kaolin both with fresh active sera and with the same sera heated at 56° C. for one-half hour. While the ninhydrin reactions with the dialysates of the Abderhalden reactions with the inactivated sera and substrats were usually weaker than when fresh active sera were used, still heating under these conditions did not entirely prevent the formation of dialyzable substances in a mixture of pregnancy serum and placental tissue. The results of the intracutaneous and intravenous injections of these heated and fresh sera after digestion with various substrats into guinea-pigs and into our own arms showed even less difference especially after a second period of incubation following the removal of the substrat by centrifugalization.

We have also added fresh guinea-pig serum complement to inactivated pregnancy serum in the proportion of 0.5 c.c. complement

to 1.5 c.c. pregnancy serum and allowed digestion to occur in the incubator for eighteen hours in the presence of various organic and inorganic substrats and adsorbents. The intracutaneous and intravenous injection of these sera showed, in a few instances, a slightly higher degree of toxicity but in the majority of cases resembled, in this respect, the same sera to which guinea-pig serum had not been added. The Abderhalden reaction, however, showed more marked difference in so far that the ninhydrin reactions were usually stronger in the former.

From these experiments we conclude that while fresh sera are more active than heated sera this increased activity is not due to the presence of complement in the sense of our conception of its rôle in the side-chain theory of antibodies, but rather that the results of the addition of serum complement are due to the normal proteolytic ferments thereby added.

DISCUSSION.

According to these experiments pregnancy serum contains proteolytic ferments which when rendered active *in vitro* produced toxic substances capable of inducing local and general reactions analogous to those observed by Vaughan, Friedberger and others and regarded as anaphylactic in nature. These observations support the views expressed in our previous communication concerning the probably anaphylactic nature of the reactions following the intracutaneous injection of *placentins* and *nephrens* although these occurred to some extent in nonpregnant women and men and in this manner lacked absolute specificity. It is highly probable that the process of proteotoxin formation in the skin (*in vivo*) is identical with that occurring in the test-tube (*in vitro*).

Our experiments also suggest that in pregnancy serum there are two sets of proteolytic ferments, one composed of normal nonspecific ferments and the second of a more or less specific ferment. While the latter may not be specific in the sense of absolute digestive power for placental protein alone, yet it appears to be rendered active in the presence of placental tissue, to a much lesser extent or not at all by other human tissues and those of lower animals and practically not at all by inorganic substances.

Our experiments are, however, in accord with those of Jobling and Petersen, Plaut, Peifer, Bronfenbrenner and others to the extent that inorganic substances as kaolin are capable of releasing the normal tryptic activity of a serum, probably through the adsorption of anti-ferment followed by the digestion of serum protein. Our work

indicates that this action is nonspecific and the results of the release of normal proteolytic ferments, whereas the activity of the specific ferments in pregnancy serum are best in evidence in the presence of placental tissue. These results are in accord with those of Bronfenbrenner(28) who found that the Abderhalden test is more or less specific as based upon the theory that removal of the antiferments depends upon a change of the colloidal conditions of the serum resulting from the specific combination of the antigen of the substratum with an antibody of the patient's serum, the serum derived of the antiferment in this manner undergoing a process of autodigestion.

It is probable, therefore, that the Abderhalden reaction is an anaphylactic reaction *in vitro* in so far as its mechanism is concerned. For the reason that normal human sera contain variable amounts of proteolytic ferments it is reasonable to expect that the intracutaneous injection of protein material into the skin may in a small percentage of persons be followed by a local reaction due to non-specific proteotoxin production.

In view, however, of the high specificity of anaphylactic reactions one cannot explain the mechanism of anaphylaxis and production of anaphylatoxins upon simple adsorption of antiferments alone without the assumption at least that specific antibodies or ferments are produced after the parenteral introduction of proteins and that these are released through adsorption of the antiferments by means of the specific protein antigen alone.

With the Abderhalden reaction as now conducted it seems impossible to avoid a certain percentage of nonspecific reactions due to the presence of nonspecific proteolytic ferments. A means of removing these preliminary to the main test for specific ferments will probably render the reaction more specific within wider quantitative limits.

While numerous investigations indicate that the protein matrix is the serum protein itself we cannot at present subscribe to this view and exclude the tissue substratum entirely as a second matrix; rather we are still inclined to believe that in addition to digestion of serum protein the tissue substratum is likewise attacked and adds to the production of proteotoxic substances.

CONCLUSIONS.

1. Proteotoxins are produced during the Abderhalden pregnancy reaction which, when injected intracutaneously and intravenously into normal animals produces local and general changes analogous to anaphylactin reactions.

2. Proteotoxins produced in a mixture of human pregnancy serum and human placenta are toxic for normal guinea-pigs.

3. The ninhydrin test with dialysates and intracutaneous and intravenous injections of the sera in the Abderhalden reactions yielded fairly parallel indices of the degree of protein digestion and proteotoxin production.

4. The addition of various tissue substrats other than placenta to human pregnancy serum was followed occasionally by proteotoxin production as shown by intracutaneous and intravenous tests with the serum but except when a substrat of human kidney was used the amount of proteotoxin produced was usually much less than that produced in mixtures of pregnancy serum and human placenta. Similar results were observed with inorganic adsorbents as kaolin, starch, quartz, etc.

5. The proteolytic ferments in healthy normal serum may produce small amounts of proteotoxins when tissue substrats are added and occasionally and to less degree with inorganic adsorbents as kaolin and starch.

6. Complement in itself has no direct relation to the ferments in pregnancy serum. Inactivation of serum probably reduces its digestive power through destruction of a normal proteolytic ferments and reactivation of a serum by means of the addition of serum complement increases its digestive power to a slight degree probably by reason of the addition of these normal ferments.

7. *In pregnancy serum there are two sets of proteolytic ferments, normal and nonspecific and specific ferments. The former may be released through absorption of the antiferment by means of various nonspecific organic and inorganic substances whereas the latter are released through the absorption of the antiferments by means of the specific protein antigen alone.*

8. Our experiments also suggest that the protein matrix in the Abderhalden reaction is not only the protein of the serum but also to some extent that of the tissue substratum itself.

NOTE.—Just before submitting this manuscript for publication a paper by Dr. J. Bronfenbrenner appeared in the *Jour. of Exp. Medicine*, 1915, xxi, p. 480, recording experiments similar to ours. The author believes that the poison originates from the serum as a result of its autodigestion and not from the substratum and that these are toxic only for homologous animals.

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A STATISTICAL STUDY OF THE FREQUENCY OF FUNNEL PELVES AND THE DESCRIPTION OF A NEW OUTLET PELVIMETER.*

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(With illustrations.)

ABNORMAL female pelves may be divided into two groups; those in which the contraction occurs principally or entirely at the pelvic inlet and those in which the contraction occurs principally or entirely at the pelvic outlet. Concerning the former we possess a voluminous literature and the identity and classification of this group are well established. In the latter group, however, almost the reverse may be said to obtain. The literature is scanty in comparison, and in fact until very recently the so-called "funnel pelvis" was but briefly mentioned as a distinct entity.

When, however, we face the fact that the most frequent type of abnormal pelvis occurring in white women is a contraction of the pelvic outlet and that the resulting operative frequency is even greater than in the usual types of contracted pelves, we are compelled to acknowledge that this group deserves serious consideration.

The diagnosis of outlet contractions depends upon the external palpation of certain bony points and the mensuration of certain diameters taken between these points. These landmarks are namely, the points corresponding to the most widely distant portions of the inner lips of the tubera ischii, the lower margin of the symphysis pubis and the posterior surface of the tip of the sacrum. The method used in determining these measurements will be described later. It may be well, however, at this time to discuss the terminology employed in connection with outlet measurements.

The greatest distance between the inner lips of the tubera ischii is designated as the transverse diameter of the outlet. The shortest distance between the lower margin of the symphysis and the anterior surface of the tip of the sacrum is called the anteroposterior diameter. From the center of the transverse diameter extending forward to the lower margin of the symphysis a line may be drawn which is known as the anterior sagittal diameter. Likewise from the same point on the transverse diameter a line may

* From the Obstetrical Department of the Johns Hopkins Hospital and University.

be extended posteriorly to the anterior and lowermost point of the tip of the sacrum. This is spoken of as the posterior sagittal diameter. When one recalls these points on the bony pelvis it will be seen that the anteroposterior diameter lies in a different plane from the others and does not represent the sum of the anterior and posterior sagittal diameters. The anteroposterior diameter may be considered as the base of a triangle whose limbs are formed by the anterior and posterior sagittal diameters.

At the Johns Hopkins Hospital whenever the transverse diameter is 8 cm. or less the outlet is designated as contracted. This limit is set for two reasons; serious dystocia does not occur when it is exceeded and furthermore if the limit were set at a higher figure the incidence of funnel pelvis would be so great as to become ridiculous.

For practical purposes contractions of the pelvic outlet may be divided into three groups: the typical funnel, the generally contracted funnel, and the complicated funnel. In the first group the contraction is limited to the pelvic outlet while the superior strait remains normal. In the generally contracted variety there is associated with the narrowing of the inferior strait a diminution in the size of the entire pelvis. In other words, such a pelvis may be regarded as a generally contracted pelvis to which is superadded an outlet contraction. The last group, the complicated funnel pelvis, refers to a small number of flat or rhachitic pelvises to which is added a contraction of the outlet.

In regard to the etiology of the typical funnel pelvis, probably the best explanation is found in the study of the so-called assimilation pelvis. In this condition we have the last lumbar vertebra assimilated to the sacrum which leads to the presence of an extra vertebra making six divisions to the sacrum. As a result of this abnormality, the innominate bones are forced to rotate to a greater or less degree about a horizontal axis. This causes the distance between the tubera ischii to be shortened and as a consequence the pubic arch is narrowed.

That this process may be considered as the etiologic factor in the formation of the majority of typical funnel pelvises was pointed out by Breus and Kolisko in 1900, Bayer in 1903, Schmitz in 1906 and Williams in 1909. The last-named author was able in 10 per cent. of his cases actually to count six sacral vertebra by vaginal examination without anesthesia.

Another fact pointing to lumbosacral assimilation as the etiologic factor is found in the consideration of the incidence of funnel pelvises in white and black women. When we consider that typical funnel

pelves occur in each race with equal frequency and that in the colored race contracted pelves occur four or five times as frequently as in the white, it will be seen that some etiologic factor other than that concerned in the usual contractions must be considered.

From a practical standpoint, the first important communication in this country in regard to the funnel pelvis was made in 1909 by Williams. At that time the findings in the pelvic measurement of 1200 women delivered at full term at the Johns Hopkins Hospital well emphasized the value of outlet pelvimetry as a routine procedure. Two years later the same author reported the findings in 1015 additional women making a total of 2215 pelves. In the present paper it becomes my pleasure to add to these the findings in 1785 additional women, making a total of 4000 women delivered at full term in which the pelvic outlet had been measured. This number of cases is drawn from a series of 4957 consecutive patients (cases 2000-6957). The results of the findings in the entire series may be tabulated as follows:

TABLE I.—SHOWING FREQUENCY OF SEVERAL TYPES OF ABNORMAL Pelves IN 4000 CONSECUTIVE FULL-TERM LABORS.

White (2459 patients)	Total number	Incidence percentage	Percentage of contracted pelves	Spon-taneous	Opera-tive
Funnel.....	122	4.96	36.97	79	43
Gen. contracted.....	112	4.56	33.94	86	26
G. C. funnel.....	18	0.73	5.45	12	6
Simple flat.....	52	2.11	15.75	31	21
G. C. rachitic.....	11	0.44	3.36	5	6
Atypical.....	7	0.28	2.12	2	5
Flat rachitic.....	5	0.20	1.51	2	3
Atypical funnel.....	3	0.12	0.90	1	2
	330	13.40	100.0	218	112
Black (1541 patients)	Total number	Incidence percentage	Percentage of contracted pelves	Spon-taneous	Opera-tive
Gen. contracted.....	279	18.10	45.22	246	33
G. C. funnel.....	69	4.47	11.18	53	16
G. C. rachitic.....	155	10.06	25.12	89	66
Funnel.....	89	5.76	14.42	79	10
Flat rachitic.....	15	0.97	2.43	9	6
Simple flat.....	7	0.45	1.14	4	3
Atypical.....	3	0.19	0.49	1	2
	617	40.00	100.0	481	136

Thus it is seen that in the 4000 women, 2459 of whom were white and 1541 colored, there were 211 typical funnel pelves, an incidence of 5.3 per cent. Of these 122 occurred in white and the remaining 89 in colored women, or 4.96 and 5.76 per cent. respectively.

The foregoing table gives the frequency of all types of contracted pelves observed in the series. In addition to 122 funnel pelves in the 2459 white women there were 208 contractions of the pelvic inlet, as compared with 89 and 528 in the 1541 colored women—a total incidence of 13.40 and 40 per cent. respectively.

It will also be noted that the most common variety of contracted pelvis in white women is the funnel pelvis, while in colored women this type ranks fourth in the order of frequency.

In the 122 funnel pelves found in the white series the distance between the tubera ischii measured:

8.0 cm. in 60 cases.
7.5 cm. in 26 cases.
7.0 cm. in 9 cases.
6.0 cm. in 1 case.

In the 89 funnel pelves found in the colored series this distance measured:

8.0 cm. in 60 cases.
7.5 cm. in 22 cases.
7.0 cm. in 4 cases.
6.5 cm. in 1 case.
6.0 cm. in 1 case.
5.5 cm. in 1 case.

In the 122 white women interference was necessary in 43 cases, as compared with 10 in the 89 colored women: a percentage of 35.24 and 11.24 respectively. In the same series the operative frequency in the usual types of contracted pelvis was 33.17 and 23.67 per cent. respectively. This shows that contractions of the outlet and inlet are of almost equal importance in the causation of dystocia in white women, but to a less extent in the colored race. The fact that operative interference is much less prevalent in the colored race notwithstanding the greater incidence of more marked contractions of the pelvis is due to the smaller size of the children. In his report, Williams stated that in the operative cases the white children averaged 500 grams heavier than the colored children.

In the 211 cases presenting funnel pelvis were found 112 perineal lacerations, an incidence of 57.8 per cent. While this in itself is striking, it becomes more so when we note that 48 of these were second degree tears and that in three cases the laceration ex-

tended through the sphincter ani. The reason for the increase in number and severity of perineal lacerations in these cases becomes apparent, when we consider the effect of the deformity upon the course and direction that the child's head must take.

When the child's head passes through the normal pelvic outlet the course is more or less anteriorly, fitting under the pubic arch. If for any reason, this arch becomes narrowed, as in funnel pelves, it is evident that the head will be forced to pursue a more posterior course than normal, and thus the soft parts will be jeopardized to a greater or less degree. In extreme degrees of narrowing of the arch it is evident that birth cannot occur unless the posterior-sagittal diameter is correspondingly increased.

Fortunately, we are able in the great majority of both normal and funnel pelves to temporarily increase this diameter. This may be accomplished by placing the patient in any one of three positions, namely, the exaggerated lithotomy position, the squatting posture, or the so-called modified Sims' position. The first two positions cannot be maintained for any great length of time, and so are not practical; while the squatting posture is not compatible with aseptic technic. The modified Sims' position has been found to obviate both of these difficulties and to be equally efficacious in producing the desired result. This posture is the ordinary Sims' position in which the legs are more sharply flexed than usual. It may also be referred to as the lateral posture.

With this in view 500 consecutive cases were measured, first in the ordinary obstetrical posture and immediately afterward in the modified Sims' position. The increase in the anteroposterior diameter was found to be as follows:

Increase of 0.00 cm. in	20 cases.
Increase of 0.25 cm. in	6 cases.
Increase of 0.50 cm. in	53 cases.
Increase of 0.75 cm. in	18 cases.
Increase of 1.00 cm. in	122 cases.
Increase of 1.25 cm. in	17 cases.
Increase of 1.50 cm. in	121 cases.
Increase of 1.75 cm. in	11 cases.
Increase of 2.00 cm. in	89 cases.
Increase of 2.25 cm. in	3 cases.
Increase of 2.05 cm. in	29 cases.
Increase of 3.00 cm. in	10 cases.
Increase of 3.50 cm. in	1 case.

In other words, it becomes evident then that by this procedure we may expect a gain of 1 cm. or more in 80.6 per cent. of all cases.

Before taking up the technic of mensuration it is essential that some idea of the normal outlet dimensions be gained. Various authors have from time to time given measurements that might be considered as the normal standard, but looking them over more or less variation is noted. According to Klien in 113 normal pelves these measurements were:

Transverse.....	11.0 cm.
Anterior sagittal.....	6.0 cm.
Posterior sagittal.....	9.5 cm.
Anteroposterior.....	11.5 cm.

Williams reported the average measurements in 185 normal pelves:

Transverse.....	10.5 cm.
Anterior sagittal.....	5.0 cm.
Posterior.....	7.5 cm.
Anteroposterior.....	11.5 cm.

Cummings measured 70 normal pelves with the following averages:

Transverse.....	10.2 cm.
Anterior sagittal.....	5.4 cm.
Posterior.....	8.5 cm.
Anteroposterior.....	11.3 cm.

It is evident from the above that to attain a standard which will approximate normal the average measurements of a greater number of pelves are necessary. Accordingly from the records of 1000 white women presenting normal pelves, I have calculated the following average measurements:

Transverse.....	9.5 cm. (9.556)
Anterior sagittal.....	5.0 cm. (4.962)
Posterior.....	7.5 cm. (7.497)
Anteroposterior.....	10.5 cm. (10.545)

It is interesting to note that the transverse and posterior-sagittal measurements correspond almost exactly with those of Emmons who measured 217 dried female pelves, specimens of the American Indian squaw. His average for these diameters were 9.79 and 7.56 cm. respectively.

In order that the physician may correctly recognize any contraction of the pelvic outlet it becomes necessary that he employ means by which the various diameters here referred to may be measured. For this purpose the ordinary pelvimeter is available for only one measurement, namely, the anteroposterior diameter. For the determination of the transverse diameter a special instrument has been devised by Williams, who has also devised another

instrument for the mensuration of the anterior and posterior sagittal diameters. The object in the design of the instrument here presented was to devise a single instrument which would obviate the necessity of using two separate instruments or an assistant, as was heretofore necessary.

Accordingly a device was sought which would combine the Williams' instrument for measuring the anterior and posterior sagittal diameters with one by which the transverse diameter could also be measured. Therefore, the following additions and changes in the Williams' instrument have been made. In place of the solid horizontal bar a telescopic measuring arrangement was added (Fig. 2). This consists of two tubes of unequal size, the smaller of

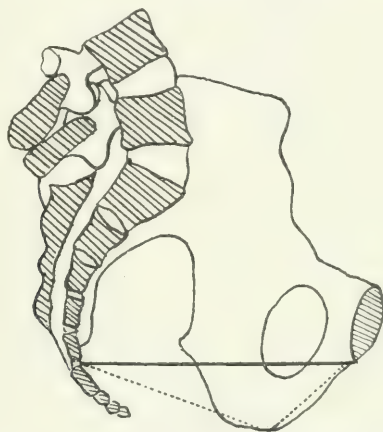


FIG. 1.—Sagittal section of pelvis showing planes of antero-posterior diameter (solid black line) and anterior and posterior sagittal diameters (dotted lines).

which slides easily within the larger. At the end of each is an adjustable thumb bracket which may be bent so that it will fit the thumbs snugly. Upon the smaller of these tubes is calibrated a centimeter scale so that when this tube is completely telescoped into the larger, the distance between the thumb nails is 6 cm. Running lengthwise upon the upper side of the smaller tube is a square groove by means of which lateral turning is prevented, and which also keeps the tubes together when they are drawn out to their fullest extent, a distance of 11.75 cm. between the thumb nails.

It will also be noticed that the original centimeter scale of the Williams' instrument has been changed. In place of the single scale at the side of the instrument, two scales have been added which read at the opposite end of the instrument from the horizontal

bar. By means of this change one scale is always directly in front of the user, so that the reading is facilitated.

The following is the routine procedure for outlet mensuration with this instrument. The patient is placed in the ordinary obstetrical examining position, on the back with the legs flexed and the buttocks slightly protruding over the end of the table so that the end of the sacrum is easily reached. The tubera ischii are first palpated. This is accomplished by grasping the buttocks in each

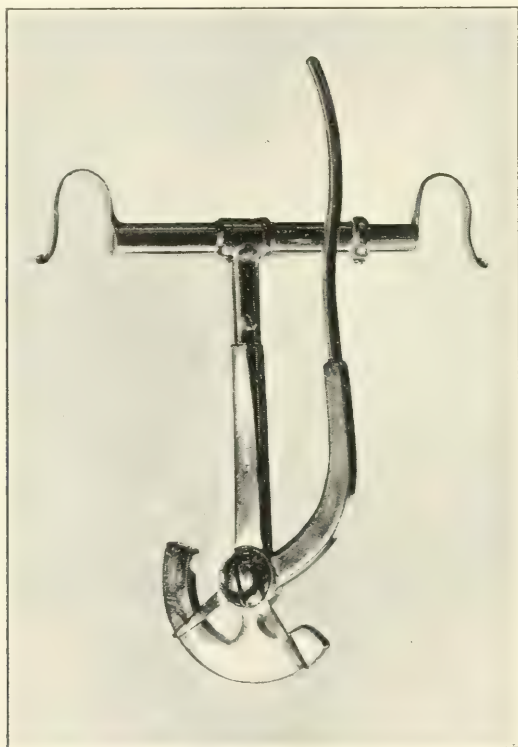


FIG. 2.—Outlet pelvimeter. $\frac{1}{2}$ size.

hand in such a way that the inner surface of the ischiopubic rami may be outlined by the inner surface of the thumbs. By this maneuver we can locate the tubera and also roughly estimate the width of the arch. After palpating the most widely distant portions of the tubera, the thumbs are placed in such a position that their nails form a prolongation of the inner surface of the most widely separated portions of the ischial bones. The pelvimeter is now fitted upon the thumbs, as in the accompanying il-

lustration, and the most widely distant portions of the tubera again found, when the distance between the thumb nails is read directly on the centimeter scale. With the instrument still in position, the tubes are closed and one thumb is disengaged. The disengaged hand grasps the center of the horizontal larger tube and maintains it with slight pressure so that the axis of this part of the instrument corresponds to the transverse diameter. The anterior and posterior sagittal diameters are then measured by the method described by Williams. In this the curved blade of the instrument is carried forward so that its tip reaches the lower margin of the

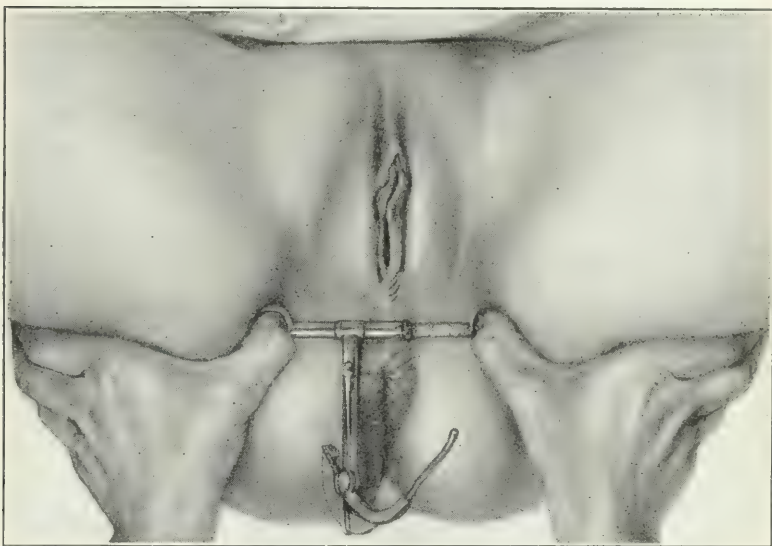


FIG. 3.—Measurement of transverse diameter of outlet.

symphysis. The distance is read from the scale nearest the examiner. With the horizontal tube still in position, the curved blade is swung around and its tip carried to the posterior surface of the tip of the sacrum, and the reading taken as in the preceding measurement.

The anteroposterior diameter may be taken with an ordinary pelvimeter or preferably by one in which the blades are only slightly curved. The blades are grasped in either hand as in the usual pelvimetric method. The end of one blade is made to rest upon the lower margin of the symphysis and the end of the other upon the external surface of the tip of the sacrum. Owing to the thick-

ness of the sacral bone, which is estimated at 1 cm., it is necessary to deduct that amount from the readings in which to obtain the true anteroposterior and posterior sagittal diameters.

I have not taken up the operations resulting from the funnel pelvis except in a general way in the table. These have been considered at length in Williams' papers, and in these additional cases the experience has been practically the same. However, later experience shows that when marked outlet contraction gives rise

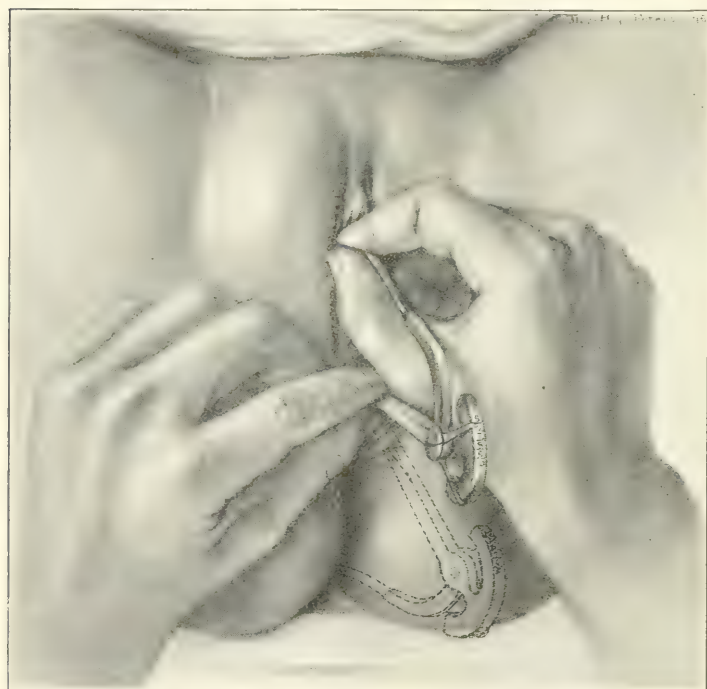


FIG. 4.—Measurement of anterior sagittal diameter.

to serious dystocia, pubiotomy is the operation of choice, for the reason that it not only affords a means of effecting delivery at the time, but in many instances leads to a permanent increase in the size of the outlet which makes possible spontaneous labors in the future. In many instances, this increase is very striking, as may be noted in the study of the outlet measurements before and after pubiotomy, in the cases here presented.

Case I.—Patient No. 3797 presenting a simple funnel pelvis.

On admission.		On discharge.	
Transverse.....	7.0 cm.	Transverse.....	8.25 cm.
Ant. sagittal....	6.0 cm.	Ant. sagittal....	14.5 cm.
Post. sagittal....	8.0 cm.	Post. sagittal....	9.5 cm.
Ant. post.....	11.5 cm.	Ant. post.....	11.5 cm.

Case II.—Patient No. 3844 presenting a generally contracted rachitic funnel pelvis.

On admission.		On discharge.	
Transverse.....	8.0 cm.	Transverse.....	10.5 cm.
Ant. sagittal....	5.0 cm.	Ant. sagittal....	5.5 cm.
Post. sagittal....	7.75 cm.	Post. sagittal....	8.0 cm.
Ant. post.....	12.0 cm.	Ant. post.....	12.5 cm.

Case III.—Patient No. 4707 presenting a simple funnel pelvis.

On admission.		On discharge.	
Transverse.....	6.5 cm.	Transverse.....	9.0 cm.
Ant. sagittal....	16.0 cm.	Ant. sagittal....	6.0 cm.
Post. sagittal....	9.0 cm.	Post. sagittal....	19.0 cm.
Ant. post.....	11.5 cm.	Ant. post.....	13.0 cm.

Case IV.—Patient No. 5116 presenting a generally contracted funnel pelvis.

On admission.		On discharge.	
Transverse.....	8.0 cm.	Transverse.....	10.0 cm.
Ant. sagittal....	15.0 cm.	Ant. sagittal....	4.0 cm.
Post. sagittal....	8.0 cm.	Post. sagittal....	8.5 cm.
Ant. post.....	12.0 cm.	Ant. post.....	11.5 cm.

Note.—This patient was delivered twenty-three months later of a full-term child, born spontaneously.

Case V.—Patient No. 6037 presenting a flat funnel pelvis.

On admission.		On discharge.	
Transverse.....	7.5 cm.	Transverse.....	8.5 cm.
Ant. sagittal....	5.5 cm.	Ant. sagittal....	4.5 cm.
Post. sagittal....	8.5 cm.	Post. sagittal....	7.5 cm.
Ant. post.....	12.0 cm.	Ant. post.....	11.0 cm.

To recapitulate briefly:

1. The most frequent type of contracted pelvis occurring in white women is the funnel pelvis: constituting 37 per cent. of all contracted pelves found in that race.

2. It is of equal incidence in both the white and black races, but owing to the greater frequency of the usual types of contracted pelvis in the latter race it constitutes but 14.5 per cent. of all contracted pelves in black women.

3. Owing to the course the child's head must take in funnel

pelves, we must expect an increase in the number and severity of perineal lacerations.

4. By means of the modified Sims' posture we have an excellent means of increasing temporarily the anteroposterior diameter of the outlet.

5. In severe contractions of the outlet pubiotomy is the operation of choice, in many instances transforming the deformed pelvis into one with practically normal measurements.

6. The following may be taken as the average measurements of the normal outlet.

Transverse.....	9.5 cm.
Ant. sagittal.....	5.0 cm.
Post. sagittal.....	7.5 cm.
Anteroposterior.....	10.5 cm.

7. By use of the pelvimeter herein described we have an easy and accurate means of determining the diameters of the pelvic outlet.

In conclusion I wish to thank Prof. J. Whitridge Williams for the use of the material in the preparation of this paper and for many valuable suggestions.

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THE ETHEROMETER, A MEANS FOR MECHANICAL ANESTHESIA.*

BY

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(With illustrations.)

My observations having led me to believe that there would be many advantages in a mechanical method of administering anesthetics, I have been experimenting for more than two years to find some simple device that would automatically administer an anesthetic. To-night I wish to present to you an apparatus which is the result of this work. I have named this device the Etherometer. The results which I have obtained with it in the administration of between 400 and 500 anesthetics justify me in stating that mechanical anesthesia is more satisfactory in every respect than anesthesia produced by hand methods, and it is the advantage of this mechanical anesthesia that I wish to impress upon you.

The device in itself is simple. In construction and mechanical principle it is similar to the vichy syphon. It consists of an air-tight graduated glass container having a cap arranged with two valves. One valve is an inlet valve for air, similar to the valve in an automobile or bicycle tire which permits air to enter but has a shut-off to prevent its escape. The other valve is an out-let valve to control the flow of anesthetic forced out under the air pressure. This valve is so adjusted that the number of drops per minute discharged from the container may be very accurately controlled. The air pressure necessary to operate the device is obtained by means of a small rubber hand bulb similar to an atomizer bulb. This bulb is only used to charge the apparatus after which it is removed just as in the case of a bicycle tire pump, after the tire is inflated. When the Etherometer is filled with the anesthetic and charged with air in this way it is ready for use and will operate automatically until it is emptied. The anesthetic is discharged through a long flexible tube to the face mask where it is diffused upon the gauze by means of multi-perforated

* Read before the Society of the Alumni of Bellevue Hospital on March 3, 1915, and in part before the New York Obstetrical Society on May 11, 1915.

tubes arranged in the mask. All the anesthetist has to do is to place the mask upon the patient's face and turn the valve so that the requisite number of drops per minute are flowing to the mask. The rate of flow is observed through the glass sight feed on the cap.

One can readily see the advantage of initiating an anesthetic with this apparatus. The careful initiation of an ether anesthesia is very important, as one well knows, but the accurate, careful administration of chloroform is vital. Chloroform carelessly, too freely, or rapidly administered at the beginning is the cause of many deaths. It has been said that 50 per cent. of the chloroform deaths occur at the inception of anesthesia. A gradually increasing or diminishing amount of anesthetic, which can be given by this device, means a gradually increasing or diminishing percentage of ether or chloroform vapor. There are no abrupt changes. The patient is not subjected to the many disadvantages of first having to breathe free air and then suddenly forced to breathe a concentrated ether or chloroform vapor.

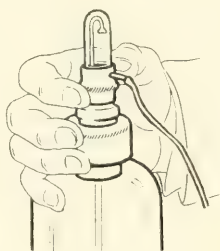


FIG. 1.

In my opinion it is these rapid changes in percentage of anesthetic vapor respired that cause many of the difficulties, such as excitement during early stages of anesthesia, retching and vomiting and mucous secretion. With this apparatus a constant percentage of anesthetic vapor is maintained. Ordinarily, one would suppose that a constant percentage of anesthetic vapor could not be obtained by the open-drop method however constant or regular the flow of anesthetic upon the mask might be, but I believe that this is the most perfect form of vapor anesthesia, for the following reasons: If the patient is breathing regularly, as he will do in most cases if the anesthesia has been carefully initiated, and a definite square surface of gauze of a certain thickness is used upon the mask, and the anesthetic is delivered upon this gauze at a constant temperature and in a regular flow, there will of necessity be vaporized with each regular expiration a certain amount of anesthetic which will pass away into the atmosphere, and

there will be vaporized and inhaled with each inspiration a certain definite quantity of vapor, which will vary in percentage in direct ratio to the number of drops per minute of the anesthetic flowing upon the mask. While I have not made any experiments to accurately determine the exact percentage of anesthetic vapor inhaled in this way, I feel satisfied for the reasons just stated that a very constant vapor must be maintained where the breathing is regular.

Other forms of administering anesthetics cannot be more accurate or uniform. Let us assume for instance that by an accurate mixture of ether vapor with air we have obtained a certain known percentage of ether vapor and we deliver this to the patient by means of nasal



FIG. 2.

tubes and that we can continue at will the administration of this percentage of ether in any given quantity. We would naturally suppose this to be the most scientific and accurate administration of anesthetic vapor, but there is a factor that upsets all of our calculations and that factor is the dilution of our constant vapor by air passing through the mouth. By reason of the manner of breathing or the manipulations of the surgeon in mouth cases our patient will not actually inspire the percentage of anesthetic vapor delivered through the nasal tubes but may get irregular percentages, depending upon the admixture with air by way of the mouth.

Another vapor method which is even less accurate is by blowing air

through a liquid anesthetic and delivering the vapor thus produced to the patient by means of nasal or mouth tubes. Here we have all of the faults of the administration of an anesthetic by nasal tubes, and in addition we cannot by this method be sure of the percentage of anesthetic vapor or control with any degree of accuracy its variations. The volume of air passing through the anesthetic is more or less variable when a hand or foot pump is used and the refrigeration of the anesthetic has a tendency to diminish the percentage of vapor. When we introduce the element of heat in this method, we still further complicate matters. In our open-drop method, with an accurately controlled flow of anesthetic, the heat of the respired air does the work of vaporization and is a definite quantity.

The only methods that seem to me to be scientifically accurate are: first, a method by which the patient would breathe into a large bag through which passed a definite percentage of anesthetic vapor or, second, intratracheal anesthesia. Both of these methods are cumbersome and difficult of operation, so that they can never be used to any extent. Next to these methods I believe the accurate mechanical administration of an anesthetic by the open-drop method is the most scientific, and this method is simple and easy of operation.

Having shown how a definite percentage of anesthetic vapor may be obtained by this method I want to call attention to the fact that the majority of patients after they are anesthetized require about the same percentage of anesthetic to keep them anesthetized. This fact, which is borne out in many ways and is well understood by those who have given anesthesia to any extent, makes the mechanical administration of anesthetics the ideal method. The patient, as shown, is carefully gotten under the influence of the anesthetic, and after being anesthetized is kept in this condition by a constant dropping of the anesthetic, which is slightly diminished toward the end of the operation and is slightly increased from time to time if any undue irritation is anticipated, such as palpation of the gall-bladder just before closing the wound, pulling on the cervix or uterus, etc.

One of the difficulties of the hand method of administration is that we never quite know what percentage of anesthetic the patient is getting and if we are keeping the patient under lightly we may without realizing it allow him to come out, and then, wishing to correct our error, we are apt to give more anesthetic too suddenly or in too great an amount, which may tend to make the patient retch. *By the mechanical method we know that if after the first twenty minutes the patient is properly anesthetized by the administration of so many drops per minute, the maintenance of this amount of anesthetic will insure the patient remaining properly anesthetized and we can actually maintain*

the same amount. There is no guess work. We never need to feel therefore that the patient is going to come out, no matter how lightly we may have him anesthetized. This gives a great feeling of security to the anesthetizer, who ordinarily is kept on pins and needles unless he has his patient so deeply under that he knows there is no danger of any sudden change. Again, toward the end of an operation, especially a long operation, the anesthetic may be reduced by this mechanical method of administration so slowly and evenly that at the end of the operation, though ether has been used, the patient will be almost conscious.

To speak of the advantages of this form of administration of anesthetics from the standpoint of the patient is only to describe the advantages of the open-drop method properly given. It is a subject in itself and would require a special article. I can say, however, that it is my opinion that a properly administered mechanical anesthesia by the open-drop method is attended with few postanesthetic difficulties.

This apparatus is primarily an apparatus for the scientific administration of an anesthetic, but in addition it happens to be a labor-saving device. Heretofore the administration of anesthetics by the open-drop method has necessitated manual skill and muscular effort in addition to the knowledge of anesthesia. *By means of this apparatus* we need only to have knowledge of anesthesia to properly administer an anesthetic. The hands are free. This is a very great advantage. The jaw may be held up with both hands, as is often necessary. The table may be adjusted quickly without altering the anesthesia; in fact after an anesthetic has been initiated in this way very little attention is really necessary. The operator, if he has a knowledge of anesthesia, might almost administer his own anesthetic without any fear of his patient being too lightly or too deeply anesthetized. The use of the long flexible tube makes it possible to administer anesthetics in neck or breast cases without interference with the operator or his assistants by reason of the presence of the anesthetist. A towel can be thrown over the mask and the patient need only be observed at intervals.

I might continue to dwell upon the many advantages of the mechanical administration of anesthetics, but I trust I have given sufficient evidence of these advantages to convince you of the importance of considering the method.

I believe the mechanical method of administration of anesthetics is the best and most universally applicable of all of the methods of anesthesia employed to-day. I know of no simple and efficient apparatus other than the one described that will perfectly carry out this method.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY.

Fortieth Annual Meeting, Held at White Sulphur Springs, West Virginia, May 18, 19 and 20, 1915.

The President, THOMAS J. WATKINS, M. D., Chicago, in the Chair.

After an Address of Welcome by DR. G. B. CAPITO, which was responded to by DR. GEORGE TUCKER HARRISON, the reading of papers was proceeded with.

A STUDY OF HYDROPS UNIVERSALIS FETUS.

DR. EDWARD A. SCHUMANN, of Philadelphia, contributed a paper on this subject in which he reported a case.

The particular form of antenatal disease which had come under the notice of the writer, general edema of the fetus, or better hydrops universalis fetus, was one which, while fortunately of rare occurrence, had been a fairly frequent theme of medical essayists. A survey of the literature revealed the fact that there was as yet but little attempt at uniformity in the classification of the cases and a most marked variance of opinion as to the causative factors. This confusion was probably due to the fact that most observers had seen but one, or at most very few cases, and the opportunity had not been given to one man to study a large series.

The history of the case coming under the observation of the writer was as follows: Mrs. S., American, para-i, twenty-three years of age, was of healthy parentage; had measles, chickenpox, etc., in childhood, and there was a somewhat indefinite history of an attack of nephritis in infancy. When seventeen years of age she had a severe and prolonged attack of jaundice, the cause of which was not determined. With these exceptions she had always been in excellent health. Menses were established at thirteen, were regular, the flow excessive for the first year, then normal in amount, and there was some dysmenorrhea during the first day.

Her first pregnancy was marked by a kidney insufficiency of moderate degree. There was hyperemesis during the first three months, after which there developed albuminuria, together with the presence of hyalin and granular casts and erythrocytes. Pregnancy was terminated by induction of labor at the thirty-sixth week, by reason of a moderate degree of pelvic contraction, and a healthy child was spontaneously delivered. The patient slowly recovered from her kidney lesion, the urine showing some albumin for months after delivery. She then remained in perfect health for a year when she again became pregnant. This pregnancy was marked by severe

vomiting and nausea for the first four months, after which she was fairly comfortable until the seventh month. At this time, after some physical fatigue, she suffered an acute and lancinating pain in the right iliac fossa, whence it radiated to the umbilicus and toward the back. The temperature was never above 99° , the pulse rose to 120, and there was a leukocytosis of 12,500. The picture was that of an acute appendicitis and the patient was treated upon that assumption, by absolute rest, starvation, and cold to the abdomen. The pain subsided after five days and she again felt well, until with some return of the abdominal pain, there developed a rapid increase in the girth of the abdomen with great distress from pressure. This condition continued, the hydramnios steadily increasing, until on June 10 she fell into labor. Upon rupture of the membranes an estimated amount of 1 gallon of liquor amnii escaped. The fetus lay in the L. O. A. position of the vertex, labor was long and tedious, but ended in the birth of a female child which did not breathe, although the heart action was feebly perceptible for a few moments. The pulmotor was used for one-half hour, without result.

The mother made an uneventful recovery. During this pregnancy she had shown a very faint trace of albumin in the urine, on occasions, but had not been ill, nor had shown any evidence of serious disturbance of the kidney, although she gave a clinical impression of suffering from some toxemia.

The child was a female weighing 7.5 pounds. It was the seat of a marked general edema, involving the head, trunk and extremities. The facial edema was so great as to almost obliterate the features; there was a large ascites, hydropericardium and hydrothorax. Complete autopsy was not performed. The placenta weighed 4.5 pounds. It was soft, friable, pale and enormously edematous. On section, serous fluid freely escaped from all parts. Microscopically the villi showed a great edema and some degeneration of the syncytial cells. The villi presented vacuolation, there was separation of the connective tissue by edema, and the syncytial cells were swollen, their nuclei pale, and in many instances shrunken. The cord was thick and edematous, but showed no other change.

In order to draw deductions from the histories of as many of these cases as possible, all those recorded since Ballantyne's work in 1902 had been tabulated and were appended to the author's paper.

In Ballantyne's sixty-eight cases the mother was nearly always well advanced in her child-bearing life, and in only seven out of sixty-five cases was her age less than thirty.

This was not at all in accord with the statistics of cases reported since 1900, as in a total of thirty wherein the age was recorded, seventeen or over one-half were between the ages of twenty-five and thirty, of which number six were under twenty-five; nine were between thirty and thirty-five, and only four were over thirty-five years. Taking the recorded cases as a whole, the majority had occurred in women over thirty, though if the more recent cases alone be considered, these statistics must be reversed.

In only one of Ballantyne's cases was the mother a primipara; in

all the others she was a multipara and had generally had a large number of pregnancies. As might be supposed from the greater youth of the patients, the mothers in the cases collected by the writer had had fewer pregnancies. Five of them were primiparæ, eight had borne between one and three children, and seventeen were multiparæ of more than three pregnancies.

The pregnancies were frequently terminated prematurely, but when full maturity of the fetus was reached, the labors were usually tedious and difficult, owing to the swollen condition of the child, and in many instances were terminated by destructive procedures involving the fetus. The child was usually stillborn or, at most, lived but a few minutes. None survived.

When a large series of these cases was analytically surveyed, there appeared certain elements constant for all the cases, or nearly so, which seemed to point toward certain lines of investigation.

The pathogenesis and the morbid anatomy of the specimens permitted general edema of the fetus to fall naturally into two great groups, as had been stated. The first or mechanical group, including such fetal diseases as blood dyscrasias and so on, might be dismissed with the comment that such morphological defects might or might not cause a general edema, as they interfered with normal circulation or not. The pathogenesis of the developmental errors themselves was not at all understood and in the present state of biological knowledge it must remain as a problem unsolved. The cases due to toxemia, however, offered opportunity for speculation, deduction and experiment. It was the opinion of the writer that the development of this variety, comprising many more than half the cases, might be reasonably considered as due to the orderly sequence of a chain of factors, each one of which might be adduced from a careful study of the case histories from the mechanism of the production of edema in general and from a study of the facts concerned in placentation.

Such a chain of factors would include the development in the mother of one or another of the forms in which toxemia was manifested. As a result of this the production of a tendency toward edema in general, the edema being most marked at the point where blood and other body fluids interchange was most specialized, namely, the stratum spongiosum of the placenta and the tufts of the villi. There would then ensue an edema of the placenta and a decrease in its functionating capacity with the secondary alterations in nutrition and circulatory disturbances in the fetus, culminating in a general edema of that organism.

OVARIAN TRANSPLANTATION.

DR. FRANKLIN H. MARTIN, of Chicago, presented a paper on the subject in which he gave a review of the literature and bibliography up to and including the literature of the early months of 1915.

The object of the paper was to bring the bibliography of this interesting subject up to date and to present a review of the work done since his last report to the Society, presented in May, 1911, which report completed the records to January 1, 1911.

He reported in abstract all the work that has been accomplished in attempted transplantation of ovaries in the human and animal, as recorded in the literature for the last three years.

In the clinic of Dr. Simpson, a member of the Society, auto-transplantation was made by placing a piece of the better part of one ovary into the subcutaneous fat of the abdominal wall, about 2 inches inside of the anterior-superior spine of the ilium on the right side. This particular location for the transplantation was chosen for the following reasons: 1. In case of infection or gangrene of the graft it could be removed by cutting one or two stitches. 2. In case of later pain the graft could be removed under a local anesthetic without the necessity of a laparotomy. 3. The blood supply was comparatively good from the superficial branches of the deep epigastric arteries. 4. Protection was afforded by the anterior-superior spine. 5. If infection of the graft occurred the abdominal wound would not be involved. 6. That point was easily accessible at the conclusion of the operation. 7. Most important of all, it was free from the dangers of intraperitoneal or retroperitoneal transplantation when there was a possibility that the graft was already infected.

The technic of the operation was as follows: After the ovaries were removed, a portion or all of the better one was kept in normal salt solution at body temperature until the operation proper was completed. Then a small incision was made through the skin about 2 inches inside the anterior superior spinous process of the ilium. A pocket was made in the subcutaneous tissue by spreading a hemostatic forceps, and into this pocket a section from the cortex of the ovary (about $2 \times 2\frac{1}{2}$ cm.) was inserted and the skin closed by plain catgut suture. This same technic was followed on all the subsequent cases, except that in some a transplantation was made on both sides.

Dr. Chalfant reviewed the literature of transplantation of the ovaries and stated the following facts: 1. A study of the literature would indicate that certain facts in regard to ovarian transplantation were quite definitely established. 2. Homoplastic (from one animal to another of the same species) transplantation was only rarely successful. 3. Autoplastic transplantation, for a time at least, was usually successful. The onset of the menopause was prevented or delayed. 4. Even in the autoplastic grafts degeneration was common after a longer or shorter interval.

Summary of cases: Ovarian tissue was transplanted in thirty-two patients; twenty-three of these were Dr. Simpson's cases, and nine cases of Dr. Chalfant. The first one was operated on December 30, 1912, and the last one in this series on January 27, 1915.

Immediate results: A number of the patients were bad surgical risks on account of long-continued infection or hemorrhage. But one of the patients died.

Speaking of the graft, he states: "In spite of the fact that many of the sections were taken from the ovaries in intimate contact with pus tubes, in only one instance was the graft infected. In that

case two grafts were made because infection was expected. The graft on the right side was infected and was discharged on about the tenth day. The graft on the left side lived and caused no trouble. In all the others the grafts were palpable at the time the patients left the hospital. In no case was convalescence influenced by the graft. In a few instances there was a little local tenderness for a time."

In speaking of ultimate results, he divided his cases into: 1. Those in whom one ovary remained in its natural location. 2. Those from whom both ovaries were removed but the uterus remained. 3. Those from whom the uterus and both ovaries were taken.

In the first group there were thirteen cases. The graft was palpable in nine of these thirteen, the oldest one after one year. In two cases the graft increased in size and was tender and painful a few days preceding menstruation. Only one patient complained of flashes of heat or other nervous disturbances, and it was probable that in this case the ovary was infected and destroyed.

There were two cases of those from whom both ovaries were removed but the uterus remained. One of these was operated on May 22, 1914, and menstruated the first time September 5, 1914, and regularly each month including February, 1915. Flashes of heat were moderately severe just after leaving the hospital, disappeared with the onset of menstruation, and recurred again in March of this year at the time of her expected period, but less severe, and lasted about three or four weeks. The other patient had not menstruated. Menopause symptoms began three months after the operation and have been quite severe.

There were seventeen cases in the group representing those in whom the uterus and both ovaries were removed. Five patients gave evidence of continued function of the graft; it was admitted that variations in size and increased tenderness were indications of functional activity as claimed by Tuffier. The first patient gave a very interesting history. The graft seemed to go through a regular cycle of about three months. There was a gradual increase in the size of the graft for about one week, with increased local tenderness. For two months the ovarian tissue maintained its size and the patient felt splendid, was much more energetic and less readily fatigued, and the symptoms of the menopause were much less severe. After two months the graft diminished in size, the tenderness disappeared, the patient became languid and easily fatigued and the flashes of heat and nervous disturbances were very marked. From May to the latter part of November, 1914, the graft was small, but since that time she had been through one cycle and was just starting another at the time of examination. On several different occasions an irregularity of the graft was detected which corresponded in every physical characteristic to a normal Graafian follicle. This had also been noted in other patients. They were unable to offer any theory to account for this periodicity, but it had been observed by both the patient and her physician.

Another one of his patients, operated upon September 13, 1913,

had noticed that the graft varied in size. Of his seventeen patients in this group, one died and one had moved and could not be located. In the remaining fifteen the graft was palpable in twelve, and not palpable in three. It was tender in six, but only in one was there much discomfort.

In regard to the effect on the menopause, he divided the cases into four classes: 1. Absent. 2. Slight, where the symptoms were not constant, occurring usually at the time of the expected menstruation, and did not cause more than momentary disturbance. 3. Moderate, where the symptoms were more constant and troublesome. 4. Severe, where the symptoms recurred frequently during each day and caused almost constant discomfort.

Two patients had no flashes of heat or nervous disturbances; seven had slight symptoms of the menopause, in five they were moderate and in three they were severe.

These observers, in an effort to have a definite basis for comparison, sent letters to about 150 patients from whom both ovaries and tubes had been removed. These were sent to patients under forty years of age. Forty patients replied either in person or by letter. Of these forty cases, four had no flashes of heat or nervous disturbances; seventeen had only slight disturbances; eight described discomforts as moderately severe, and twenty-one as severe.

Comparing those four groups with the graft cases, we had these figures:

Symptoms of the menopause	Patients with graft		Patients without graft	
	Cases	Per cent.	Cases	Per cent.
None.....	2	10.8	4	10.0
Slight.....	7	41.0	7	17.5
Moderate.....	5	29.4	8	20.0

The authors stated in regard to these figures that while it was clear that the number of observations was too small from which to draw definite conclusions, and it was also possible that the patients who had been uncomfortable after operations were more prone to answer a letter and thus had an opportunity to make a complaint, still the comparison was interesting in the least and was in accordance with the conclusions of Drs. Martin, McIlroy and Libroia, to the effect that transplantation lessened the severity of the artificial menopause.

These authors drew the following conclusions from their work: 1. Subcutaneous transplantation of ovarian tissue did not increase the risk of operation. 2. In the majority of patients the graft would persist for a time. In this series it was still present at twenty-seven months, eighteen months, and three others more than a year. 3. In some patients it appeared to functionate as shown by the apparent development of Graafian follicles, by variation in size and tenderness, and when the uterus remained by menstruation. 4. The presence of one ovary in the pelvis did not necessarily interfere with the success of the graft. 5. Those patients in whom ovarian tissue had been grafted seem to have lost discomfort from the premature menopause.

Careful sifting of the accumulated literature of ovarian tissue

transplantation left a feeling of disappointment as to its surgical value in the mind of an impartial observer.

Autotransplantation of ovarian tissue, as the operation was at present practised, retarded and modified the symptoms of the artificial menopause that was precipitated by castration in a definite number of cases, depending undoubtedly upon the graft's ability to retain its vitality in the new environment.

The percentage of successful results in the autotransplant seemed to be as large where the simplest technic was employed, using small pieces of ovaries tucked into pockets of well-vascularized tissue, as when a more complicated technic was employed with an attempt to definitely couple up the blood-vessels.

The fact that homo- and heterotransplants were failures, made with the same technic that was employed for successful autotransplants, demonstrated that there was a definite antagonism between the tissues of different individuals of the same species, and a prohibitive antagonism between the tissues of different species.

Occasional reports of successful homo- and heterotransplants encouraged one to hope that in some way this antagonism of tissue would be overcome and more successful work might result because of the greater precision this would make possible in selecting more normal tissue.

WHAT IS THE FATE OF THE OVARIES LEFT IN SITU AFTER HYSTERECTOMY?

DR. HIRAM N. VINEBERG, of New York City, read a paper on this subject in which he drew the following conclusions:

1. "There is considerable uncertainty as to which tissue in the ovary is responsible for the production of the internal secretion. 2. While it is established that the follicles go through the various stages of development in the conserved ovary or ovaries after the uterus has been removed, it is not at all certain that the function of the internal secretion continues uninfluenced by the great changes in the blood supply and by the traumatism to which the pelvic sympathetic nerves are subjected as a consequence of the operation. 3. It is still a disputed point as to what degree the climacteric syndrome is due to the removal of the ovaries, and to what degree of injury to the pelvic nerve incident to the operation. 4. Clinically, it has been found that the freedom from the climacteric syndrome in hysterectomized women, in whom the ovaries have been conserved, is only relative to that which obtains in the same class of women in whom the ovaries have been removed. A generous estimate would be 20 per cent. in favor of the former. 5. To obtain the benefits claimed by the advocates of conservation, the ovaries should be retained at all ages and not limited to those under forty years, as is done by most of them, inasmuch as it has been shown that of the women who suffer most severely from the artificial menopause, 46 per cent. were only forty-five and over. 6. Subsequent disease of the conserved ovary, such as cystic degeneration, malignant growth, inflammatory processes, leading to adhesions, and pain

calling for a second operation, does occur in some cases, the number no doubt being much larger than would be inferred from the records found in the literature. 7. In view of the foregoing conclusions, I am of the opinion that the doubtful clinical advantages accruing from retaining the ovaries in hysterectomy are more than counterbalanced by the risk to which the patient is subjected from subsequent disease and adhesions of the conserved ovary. I would, therefore, not retain the ovaries in any case of hysterectomy unless I could leave enough of the lower segment of the uterus with its endometrium to insure the function of menstruation; for in my experience the knowledge imparted to the woman that her ovaries have not been removed has but little significance or moral effect when she learns that she will no longer menstruate."

DISCUSSION.

DR. FRANK F. SIMPSON, of Pittsburg, stated that the first instance of transplanted ovarian tissue was one that encouraged him in this line of work. The patient, a young woman of considerable importance in the community, in the thirties, had a perforated appendix with drainage for general peritonitis. The appendix was removed. Later there were adhesions about both adnexæ, which were treated. Six operations were done by leading surgeons of New York. The young woman was a confirmed invalid. She suffered intensely at the menstrual period. She, her father and mother insisted upon immediate operation on the uterus and adnexa. He did not consent to do this for a period of almost a year. Every effort he was capable of was made to relieve the suffering by local and other measures. At the end of that time she suffered as much as she did at the beginning. With a full understanding of the parents and the young woman, that this work was in the experimental stage, he consented to remove the pelvic structures. He did not transplant the ovary into the abdominal cavity, thinking it would cause serious trouble, and that disintegration of the ovarian tissue or infection might readily cause serious damage requiring a second abdominal operation. So it occurred to him that to transplant it beneath the skin might be successful. He used the adnexa, transplanted about one-half of the ovary, it lived, and to-day it was quite the size it was when it was transplanted. On a number of occasions he felt the ovary and he believed he felt the Graafian follicles. In that young woman the functional result was good. Instead of being a confirmed invalid and lying in bed, she was now about, was vigorous, and practically not harmed at all by the disagreeable phenomena of the precipitate menopause.

DR. JOHN O. POLAK, of Brooklyn, related four unreported cases of transplantation of the ovary. In three of them the entire ovary was transplanted in a pocket in the prevesical space. Two of these had caused no trouble so far as the ovarian graft was concerned. This graft had no effect on the symptoms of the menopause, that is, the woman suffering from convulsions and the other nervous phenomena. A third had become cystic, and he had seen that woman

recently. She had a cyst in that locality about the size of a two months' pregnancy. She was the only woman of these three who had had relief from the symptoms of the menopause.

His fourth case was not an implantation of the whole ovary, but a graft of the ovary into the cornu of the uterus at the point of excision of the tubes. This patient menstruated for nine months, and then menstruation ceased. She then developed all the symptoms of the postclimacteric with considerable severity and gradually those had passed away.

DR. J. WESLEY BOVÉE, of Washington, D. C., stated that the ovary floated freely in the peritoneal cavity, and it was known that an ovary that became encased in adhesions, and not necessarily by marked infection, began to undergo sclerocystic degeneration. When these ovaries were transplanted they were covered entirely with tissue, and what was to his mind a very reasonable result was they would undergo degeneration, and he did not believe the results were good or would be good so long as this plan was followed. When transplantation of ovarian tissue was resorted to, it should be done in such a way as to give freedom to such tissue.

DR. HIRAM N. VINEBERG, of New York City, recalled two cases of autotransplantation of the ovary. He took a small wedge-shaped piece of the ovary and inserted it into the lower abdominal wound, leaving it in between the fat and the skin. In one of these cases the operation was done nine months ago, and in the other about six months ago. There had been absolutely no difference in the healing of the wound. So far as one could tell from frequent examinations since then, one could not tell that transplantation had been done.

DR. JOHN G. CLARK, of Philadelphia, stated that there was no organ that had such a shifting circulation as that of the ovary, and no organ whose circulation was so rich. In the little transplantation work he had done he had endeavored to expose the cortex, to lay open the ovary, pull it open as one would a kidney, and allow the vascular portion of the ovary to come into direct contact with the peritoneum which he had utilized, and not the subcuticular tissue as Dr. Simpson had done, and thus far his experience had not been particularly satisfactory.

DR. HERMAN J. BOLDT, of New York City, stated that those who had had a large experience with conservative surgery of the adnexa must have come to the conclusion which those who had read the papers had come to and the others who had spoken, and yet in view of the fact that there were undoubtedly instances where the symptoms of the menopause were at least ameliorated, if a seemingly normal gland was conserved either by ordinary conservatism or by transplantation, personally he felt he wanted to continue that line of work. On the other hand, he could only say in those instances where conservatism had been practised, he had had the same disagreeable features to contend with that others had had. He recalled two instances where it became necessary for him to reopen the abdomen and to remove an ovarian cyst from the ovary which had been retained, and he could not recall any instance where the removal

of cysts had been more difficult than in those two cases. However, as he had said, there were instances where the symptoms of the menopause were at least ameliorated and where they were entirely absent.

DR. J. RIDDLE GOFFE, of New York City, said that about twelve years ago he made his first adventure into this field of work. The patient was a young woman whose tubes were absolutely destroyed by disease. She came from Buffalo and was anxious to have children. Her husband was equally anxious that she should have children. With the idea in mind of future offspring, he removed both tubes and one ovary; then he slit open widely the whole fundus of the uterus, being careful to preserve the meso-salpinx in his obliterating operation, and to retain as far as possible the lymphatics and the arterial nutrition of the ovary. Without slitting the ovary, he turned it right around and hung the ovary free in the uterine cavity. He kept track of this woman for about six months. She had a slight discharge of blood at the regular time of menstruation once; then she escaped from his observation, and he had not been able by correspondence to get any further information in regard to the case.

DR. JOSEPH BRETTAUER, of New York City, thought that each case for ovarian transplantation should be individualized. To some women of a nervous temperament or who were neurasthenic, the removal of the ovaries was a more serious matter than it was to other women who were not so constituted physically, and in this way we might come to some definite conclusions.

DR. WILLIS E. FORD, of Utica, was temperamentally rather pessimistic about leaving parts of ovaries. His experience had rather prejudiced him against it.

DR. PHILANDER A. HARRIS, of Paterson, New Jersey, said it was his rule in removing the uterus to leave an ovary or both ovaries, if it could possibly be done. He left all the tissues that were healthy. This might be right or it might be wrong. He was rather encouraged when he heard Dr. Goffe speak of having placed a piece of ovary in the uterus, but the question arose in his mind whether, if the woman became pregnant, it would not cause a rupture of the uterus.

DR. HERMAN J. BOLDT asked if any member knew of any cases where, after an ovary had been left and the oviducts removed, the patients had subsequently become pregnant. This question had been raised a number of times.

DR. BOVÉE replied that there were plenty of them on record.

DR. BOLDT had not seen such a case himself.

NITROUS OXID IN LABOR.

DR. N. SPROAT HEANEY, of Chicago, read a paper on this subject in which he stated that Lynch, in a recent paper, stated that Klekovich of Petrograd in 1880 was probably the first to use nitrous oxid gas during labor. He gave a mixture of eighty parts of nitrous oxid and twenty parts of oxygen to a series of twenty-five cases. As soon as the cervix admitted one or two fingers he began the use of

the gas and he continued it intermittently throughout the entire labor. He gave only sufficient to abolish pain but not enough to produce unconsciousness. The contractions were never diminished in intensity, but to the contrary were often increased. The fetal and maternal pulse were not much altered. Though his results were so gratifying, his method found no followers.

During the last ten years Dr. J. Clarence Webster at the Presbyterian Hospital had been largely substituting nitrous oxid gas and oxygen for ether in obstetrical work. Versions, forceps, Cesarean sections and various other obstetrical operations were performed under this anesthetic when it seemed better suited to the condition of the patient than ether. He also early used it for the conduct of normal labor in the second stage, allowing the patient a light degree of anesthesia during pains, with a return to the normal state between pains.

Lynch in August, 1913, began to use nitrous oxid gas and oxygen in labor by the method to be described in this paper, and subsequently the writer began independently to use it. The various members of the obstetrical department at the Presbyterian Hospital had now had a large experience in its administration and each had added some perfection in technic or had otherwise contributed to the general knowledge regarding the subject.

With a proper machine and a nasal inhaler nitrous oxid might be given to the extent that the patients did not experience pain during labor, and yet maintain their consciousness and if needs be could follow the directions of the attending physician. If oxygen was administered at the same time this stage of analgesia was more easily maintained and the headaches sometimes complained of after pure nitrous oxid were much more infrequent.

As to how much gas was necessary to bring a patient to the stage of analgesia, it depended somewhat upon the efficiency of the machine used, but principally upon the susceptibility of the individual. Some required more and others less. The less nitrous oxid required to produce analgesia, the more oxygen was necessary. Usually the mixture was such at the beginning of a pain that three to four quick inhalations were sufficient to produce analgesia while the patient retained her normal color, and remained entirely conscious. Each patient differed so that the mixture must vary also. A few pains would establish the mixture necessary in each case. When once analgesic, more oxygen might be given until at the end of a long pain either pure oxygen might be given or the nose piece removed.

If the mixture was too rich and analgesia was imperfect, and the patient went into a deeper stage and complained of pain, she then began to become cyanotic, the consciousness became clouded and if pushed further the patient entered the familiar stage of surgical anesthesia with its attendant phenomena. When giving the gas for the first time the tendency was to give much more than was necessary, the least possible amount secured usually the most satisfactory analgesia. By careful observation the analgesic stage could be maintained for hours.

The patient might be directed to keep the eyes open during the administration and to watch a light placed in a convenient location. If it was noted that the light was beginning to appear unnatural, then the patient must breathe through the uncovered mouth. If the operator observed that the lids were beginning to droop or that the lips were beginning to show a suggestion of cyanosis, the patient was directed to breathe deeply through the mouth and quickly return to the analgesic stage.

To insure absolute painlessness the gas might be given to the surgical degree during the last few pains, or as infrequently happens if the birth began to advance too rapidly, ether might be mixed with the gas or substituted for it.

In a few cases manual dilatation of the cervix was done under analgesia, the patient entirely conscious, yet feeling no pain. In the same way, the speaker on a number of occasions converted a persistent posterior to anterior presentation, introducing the whole hand into the vagina, the patient though conscious complaining of no pain.

The frequency of the labor pains was not disturbed by nitrous oxid nor was the duration of the contraction when the patient was kept in the equilibrium of analgesia. During the expulsive stage, indeed, the efficiency of the pains was increased since the patient could use the secondary muscles of expulsion to their utmost capacity without fear.

The fetal heart tones were not disturbed and the baby cried immediately upon birth; its dose of anesthesia was as evanescent in its action as was the mother's. The mother was always conscious and in full possession of her faculties within a minute or two of the birth.

There was no relaxation of the uterus and providing that ether had not been used, the third stage terminated as promptly and as satisfactorily as when no anesthetic was used.

The amount of gas necessary for the conduct of a case varies greatly with the type of machine used.

The cost of the gas might be materially lessened in hospitals by the use of the large cylinders. For outside work, an efficient portable apparatus which with cylinders would fit in a suit case was made by several different manufacturers.

Nitrous oxid and oxygen analgesia might be given just as efficiently in a home as in a hospital. No expert anesthetist was necessary. With a little instruction a layman might give the gas, the obstetrician carefully controlling the administration.

From his observation and that of the members of the staff with which he was connected, they were united in the belief that in nitrous oxid and oxygen analgesia we had not only an efficient means of controlling the suffering in labor, but also a safe means, free from all the well-known and valid objections advanced against other means of securing painless labor.

DISCUSSION.

DR. JOHN O. POLAK, of Brooklyn, asked Dr. Heaney if it was possible to continue nitrous oxid gas from the very beginning of

labor as an analgesic method, and about what would be the approximate cost of conducting a twelve- to twenty-four-hour first stage with it, and how much personal attention the obstetrician would have to give to the management of the case.

DR. WILLIS E. FORD, of Utica, asked the essayist whether there was any cyanosis in the children, or whether there was more cyanosis from the use of nitrous oxid gas than from ether.

DR. LOUIS FRANK, of Louisville, said he had used nitrous oxid gas as the anesthetic of choice in his surgical work for almost three years. In this work there had been included three cases of Cesarean section in which nitrous oxid gas and oxygen was given as the anesthetic. He thought the administration of nitrous oxid gas and oxygen for analgesic purposes required the services of an expert. He has considered it the most dangerous of all anesthetics that could be used in unskilled hands, while in skilled hands it was the safest.

The cost of the gas was lessened materially where large tanks were used and where the gas was manufactured in the hospital.

DR. HIRAM N. VINEBERG, of New York City, said that in one or two instances he attempted to do a plastic operation under the administration of nitrous oxid gas and oxygen and the blood was so black that the field of operation was obscured. He had to stop. He did not know whether it was improperly administered or not. He had to resort to ether because the operative field was dark and he could not see what there was to repair.

DR. HEANEY, in closing the discussion, stated that in his opinion, in the latter part of the first stage and second stage the gas could be given for sixty cents an hour. The amount of oxygen would vary with each patient. It depended how quickly the woman passed into cyanosis and how much oxygen one should give. The less the amount of nitrous oxid gas given, the better. With the nose-piece he had described the cyanosis in the infant was less marked. It was hard to determine what the effect of any method was, provided the baby did not require artificial respiration. If it was blue it cried immediately. It was very gratifying in Cesarean sections to have the child cry at once. One could then dismiss the child from his mind and attend to the mother, a thing which he was not able to do always under ether anesthesia in doing Cesarean section.

A STUDY OF THE MANAGEMENT OF THE PLACENTAL STAGE OF LABOR,
WITH SPECIAL REFERENCE TO RETAINED AND ADHERENT
PLACENTA.

DR. JOHN O. POLAK, of Brooklyn, New York, began some two years ago to study the physiology of the first stage of labor to determine: 1. What was the normal or usual mechanism of placental delivery when the uterus was left absolutely alone. 2. What were the clinical evidences of placental separation always apparent? 3. What was the relative proportion of postpartum hemorrhage in cases in which the placenta was delivered spontaneously as compared with those bleedings following manual extraction. 4. In what proportion of the cases was the placenta retained beyond the two-hour

limit? 5. How long might the placenta be left *in utero* without danger to the mother, and what was the danger, and, finally, what was the actual frequency of adhesion of the placenta?

To this end he had studied the placental stage in 2000 consecutive deliveries occurring in the service at the Long Island College Hospital. The routine management of the third stage of labor had been as follows: Immediately upon the delivery of the child, the cord was clamped, flush with the vulva and the fundus was watched but never manipulated until placental separation had taken place. In periods varying from fifteen minutes to two hours, certain definite clinical changes, indicating separation, had usually become apparent, namely, the cord descended, the fundus rose and was found in the middle line, the shape of the uterus became flattened from before backward, and a gush of blood escaped from the vagina, the hemorrhage then ceased as the uterus retracted. When these clinical evidences of separation were present the patient was asked to bear down and the placenta escaped from the vulva. When, however, the pressure of her abdominal muscles was insufficient to effect delivery, the uterus was grasped as in the method of Crede, stimulated to contract, the fundus laid down in the abdomen to more nearly coincide with the vaginal axis, according to the suggestion of Lambert, and expression was made by the acme of contraction. He never attempted extraction until after the clinical evidences of separation were definitely apparent, and used the Crede maneuver only for the extraction of the already separated placenta.

The exceptions to the employment of this routine in his practice had been in operative procedures in midpregnancy or before term, as in the toxemias of pregnancy or premature separation of the placenta, which had demanded immediate delivery by anterior vaginal hysterotomy or otherwise, and at term in Cesarean section, or when the woman had been subjected to a long operative delivery under anesthesia and a retraction ring had formed. Under these circumstances he immediately extracted the placenta with the first pain or removed it manually. In placenta previa, while he left the expulsion of the child to the natural forces, the placental delivery was done by expression or manual removal in order to allow for prompt retraction of the uterus, which was always retarded by the partially attached placenta.

This series could be divided into those cases, 1306 in number, attended in the Out-patient Service, in which Nature's processes of separation and expulsion and uterine retraction were allowed full play, and 694 occurring in the In-service, which included all operative cases, whatsoever the cause, in which there were 44 deliveries by forceps, 11 by craniotomy, 23 by version, 3 by pubiotomy, 29 by Cesarean section, and 34 by vaginal hysterotomy.

The normal mechanism of placental delivery, namely, separation, expulsion, and uterine retraction, with expulsion of the placenta by fetal surface downward, the cord leading the way, was observed and noted in all of the cases in which there was no uterine manipulation, and the clinical evidences of separation already referred to were

constantly present. The delivery of the placenta followed the Schultze mechanism in all cases in which there was no manipulation.

In the 1306 cases, attended in the Out-patient Service by the students and residents, no postpartum hemorrhage occurred. Among the 694 indoor patients, which included all operative procedures, bleeding occurred but three times, although only two cases required tamponade of the uterus, one an anterior vaginal hysterectomy, the other following the delivery of a twin pregnancy.

This record was in marked contrast to the statistical study in a previous series when it was routine practice to manipulate the fundus immediately upon delivery of the child. There were eighteen cases of retained placenta, five at full term, thirteen premature cases. Of the five full-term cases where the placenta were retained for more than two hours, three were delivered by Crede expression under surgical anesthesia. All had separated and presented the clinical signs of separation, but were retained in the dilated lower segment of the uterus. One remained detached in the cornu for thirty hours owing to a large myoma located in the body of the uterus which acted as a ball-valve obstruction. Expression in this case even under surgical anesthesia proved futile, and rather than go through a lacerated and infected vaginal area an abdominal hysterectomy and myomectomy was done and the placenta removed manually by this route. This placenta was not properly adherent but mechanically retained. In the fifth case the placenta was retained for ninety-six hours before separation occurred and expression was resorted to. The retention was due to the retraction of the lower segment, which relaxed under surgical anesthesia and permitted expression. In none of the retained cases was there any amount of vaginal hemorrhage, confirming Ahfeld's contention that an attached placenta or a completely detached placenta prevented hemorrhage from the placental site.

The dangers to which the mother was exposed in retention of the placenta were sepsis and hemorrhage, and he believed we were right in contending that hemorrhage was negligible while the placenta was attached or detached, and that sepsis was dependent wholly upon intrauterine manipulation through infected passages, and not upon the retention of the products of conception.

Statistics showed that 10 per cent. of the patients with adherent placenta removed manually, died of sepsis. It was entirely in accord with the writer's previous experience. Aseptic conservatism and practical radicalism had changed the results in his clinic.

From his study he made the following deductions as to the management of the placental stage, and the treatment of adherent placenta:

1. That the placenta would separate spontaneously if the normal mechanism was allowed to obtain.
2. That any manipulation of the uterus before the clinical evidences of separation were apparent disturbed this normal mechanism.
3. That postpartum hemorrhage was best guarded against by the observance of the physiological processes, and that partial detachment, the result of manipulation, predisposed to bleeding.

4. That the normal mechanism of the placental delivery was that described by Schultze.

5. That the Duncan mechanism only occurred in low implantations of the placenta or where manipulation had been untimely and vigorous.

6. That the placenta might be retained in the uterus for hours or days without danger to the patient, provided it was attached or completely detached, which insured that the bleeding would be negligible.

7. Sepsis was dependent upon the penetration to the uterus by the hand or instrument through infected passages, and not upon the retention of the placenta.

8. That manual extraction was only admissible in partial separation with hemorrhage.

9. That in retention of the placenta without hemorrhage the cord should be cut off close to the cervix and the case watched until the times of separation were apparent, when the placenta might be expressed by Credé, while the patient was under surgical anesthesia.

10. That invasion of the uterus *via* the vagina was fraught with danger from infection, and on exploration should the placenta not be found presenting at the internal os intrapelvic delivery should be abandoned and delivery accomplished through sterile avenues by suprapubic extraperitoneal hysterotomy.

11. When the adhesion was so great that its removal entailed the digging of the placenta out piecemeal, excision of the placental site or hysterectomy should be the choice.

DISCUSSION.

DR. WALTER P. MANTON, of Detroit, believed that the implantation of the placenta was, as a rule, a good deal lower than it was usually supposed. A number of years ago he took up this subject at the Woman's Hospital, Detroit, and by careful examination of uteri and of the placenta, later on, he found that in several hundred consecutive cases the implantation was a good deal lower than what it was put down in the text-books to be. The implantation was apt to be lateral rather than cornual or fundal, therefore, he did not believe that the Schultze method of delivery of placenta was the normal one, but that the Duncan method was.

DR. GEORGE TUCKER HARRISON, of Charlottesville, Virginia, said that in cases in which the placenta was attached he agreed with Dr. Manton that the Duncan method was the one that should be employed. In such cases it was employed quite frequently. As soon as the child was born, he thought it was wrong to exercise compression. He would advise letting it alone.

PRIMARY CANCER OF THE FEMALE URETHRA; PLASTIC WORK AND LATE RESULTS.

DR. H. S. CROSSEN, of St. Louis, Missouri, stated that primary cancer of the female urethra, although a rather rare disease, had

been reported often enough to have lost its novelty. The reported cases had been tabulated and the subject well worked up by several observers, notably by Percy in 1903, and by McMurtry in 1908.

There were two points in connection with the subject which he wished to consider: 1. The later results, that is, the cure of the cancer, and 2. the plastic work rendered necessary by the excision of the carcinomatous urethra.

In order to determine the proportion of cases cured by operation, he had tabulated the operative cases found in a cursory examination of the literature as follows: Cases subject to radical operation, twenty-five; cured (three years) eight; probable cures (two years) three; recurrence known, eight; result not known, six.

Thus it would be seen that of the treated cases about one-half were cured. This was a very encouraging showing, considering the fact that lymphatic metastases took place directly in the deep glands within the pelvis. On account of the direction of the lymphatic drainage, the first metastases made recurrence certain, for the affected glands were beyond reach.

In the series tabulated, some of the operations were not very extensive, removing only a half or two-thirds of the urethra. The large proportion of cures was probably due to the fact that in the urethra an area of irritation caused symptoms very early, and thus led to investigation in diagnosis and radical treatment while the disease was still in a comparatively early stage.

In this location, as elsewhere, the cancer was sometimes preceded for some years by a point of chronic inflammation. This persistent precancerous irritation was especially noticed in the first of the author's three cases of primary cancer of the uterus.

The details of the three cases were given.

The amount of plastic work required depended upon the extent of the radical operation. In regard to the extent of the operation the author had adopted a middle course. It seemed to him that removal of the whole urethra with the immediately surrounding tissues, as explained, was indicated in practically every case. Less than this would not secure removal of the structures likely to be involved by continuity of the tissue. On the other hand, a more extensive operation would be a useless mutilation. A cancer presenting infiltration beyond the limits mentioned would almost certainly show metastases to inaccessible glands in the pelvis.

This radical operation of moderate extent (excision of the urethra) was preferable not only from the standpoint of cure of the malignant disease, but also from the standpoint of subsequent urinary control. With suitable plastic work good urinary control could be given, as in two cases related. On the other hand, more extensive excision entailed partial or complete urinary incontinence of a type most difficult to overcome. This fact was made clear by two of his cases. In one three subsequent plastic operations were necessary to give urinary control, and in the other incontinence was cured by the formation of a vesicovaginal rectal fistula and colpocleisis. In both

of these cases a less serious operation would have given much better urinary control with practically the same chance of cure.

The operative technic which he had employed was probably much the same as that used by others, although no detailed account of such had come to his notice.

The technic of the operation was shown by slides.

DISCUSSION.

DR. LEWIS S. MCMURTRY, of Louisville, stated that the chances for a radical operation being successful were very much endangered by the natural delay in making a diagnosis of cancer of the female urethra. He ventured to say, that nearly all cases reported had been primarily operated upon as urethral caruncle and the malignant character of the growth had been lost sight of until the patient had been under treatment for caruncle for some time, and then failure of this treatment and extension of the growth had impressed the surgeon with its true character. If these cases were taken very early, and diagnosed promptly, the same as cancers in other portions of the genitourinary tract in women, he thought the results would be much better from complete excision.

DR. FREDERICK J. TAUSSIG, of St. Louis, Missouri, said that if we included all cases where the history pointed very strongly to primary growth of the urethra and conditions at the time of examination showed a cancer involving the urethra and surrounding tissues, we would find the reports very much more favorable.

He had occasion about three months ago to remove a small nodule from the urethra of a woman, fifty-three years of age, and a pathologist examined it a long time before he made up his mind it was malignant. The epithelial proliferations in the urethra closely simulated early cancer, and he had the impression that probably a certain number of these cases that had been reported as cures were not really cancers at all.

DR. JOSEPH BRETTAUER, of New York City, stated that he had had but one case of primary cancer of the urethra. He had seen several cases of carcinoma of the external genitals and had published a series of five cases. Carcinoma of the female urethra was the most dangerous and malignant of all carcinoma he had encountered. Every one of the cases he had published was operated radically. It was exceedingly difficult, if not impossible, to differentiate between early carcinoma of the urethra and urethral caruncle. It was more guesswork than anything else.

DR. HIRAM N. VINEBERG, of New York City, stated that one of the cases Dr. Crossen had reported was one to which his name had been attached, and he could vouch for the genuineness of that particular case. The specimen was examined by two good pathologists and both made a diagnosis of carcinoma. The woman after operation was free from the disease for three years. She was still free from any recurrence, it being now ten years since the operation was done.

DR. J. RIDDLE GOFFE, New York City, stated that some years ago while he was in the New York Skin and Cancer Hospital a woman came into the service who gave a history of having had trouble with her urethra years before. She had been in the hands of Dr. Lusk, and Dr. Lusk had said to her that all cases that were operated on died from cancer, and he thought the best thing to do was not to operate on the disease itself, but to buttonhole the urethra posteriorly to the growth. This was done, and the woman was relieved of the suffering she had from the urine, and it also delayed the development of the growth by relieving the irritation. This emphasized the point that cancer was due to irritation. While Dr. Lusk made no diagnosis of a cancerous condition and did not recognize urethral caruncle, still he thought the best thing was to buttonhole the urethra posteriorly, and allow the urine to escape and not irritate any more than possible the growth she had. When she appeared at the hospital there was an undoubted cancerous growth from her general appearance, and she was a terrible sufferer. He advised its removal and did so. But he never knew anything to return or to develop so colossally as the disease in that case. The woman suffered frightfully from invasion of the disease and died within three months after operation.

He had had one other case since then in which he removed the urethra. The woman regained her health afterward, then he lost track of her.

DR. WILLIS E. FORD, of Utica, stated that his first case of primary cancer of the urethra was in a doctor's wife who lived in northern New York. The growth, which was about as large as a walnut, had obstructed the passage of urine. He had no idea what the trouble was when he went to see the patient. He removed the urethra to such an extent that he thought he left but very little of it. He did a purse-string, closed up, and the patient got retention of urine. The growth, however, returned within six or eight months. Since that time he had seen half a dozen cases, and with the exception of primary cancer of the clitoris, he thought it was the most rapidly fatal of cancers he had seen or had had anything to do with.

DR. CROSSEN, in closing the discussion, emphasized the extent of the radical operation. In carcinoma of the urethra, it seemed to him that where the disease was still confined to the urethra, it was unnecessary to go beyond the urethra. It was unnecessary to excise the external genitals or the inguinal glands for the reasons mentioned in regard to lymphatic drainage. On the other hand, if the disease had extended so deeply that it became necessary to take out a portion of the bladder, it had probably extended to the deep glands and was beyond reach. It may have extended so far that one would have to take out the neck of the bladder or the deep inaccessible glands. In that case he fully believed a palliative operation was the only one that was justifiable.

(To be continued.)

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.*

Meeting of February 4, 1915.

The President, DANIEL LONGAKER, M. D., in the Chair.

The following papers were read*

Dr. G. Betton Massey: "(1) An Improved Ionization Method for Cancer of the Cervix. (2) Sinusoidal Galvanic Reversal in Enteropositis and Pelvic Relaxation; Two New Electrical Methods in Gynecology."

Dr. William L. Clark (by invitation): "The Use of Desiccation in Gynecology."

Dr. A. B. Hirsh: "Static Currents of Value in Gynecology."

Dr. George E. Pfahler (by invitation): "The Treatment of Uterine Hemorrhage and Fibroid Tumors by Means of the Röntgen Ray."

Dr. Brooke M. Anspach: "Experiences with Radium in the Treatment of Cancer of the Cervix."

DISCUSSION.

DR. JOHN G. CLARK.—I have sometimes questioned the necessity for the increased requirements for entrance to our medical schools, but the discussion this evening, which has had entirely to do with electricity and radio-activities, has demonstrated the fact that few of us understand anything of the technical details of physics. In fact most of us have been led into deep water so far as the description of the underlying principles of the electric and physical details are concerned. We can only appreciate the ultimate clinical results. Concerning the several questions which have been brought up by Dr. William L. Clark, I am particularly impressed with his fair and judicious summary of results in the employment of fulguration methods of treatment. He has rated the treatment most conservatively and has not made wide-sweeping claims which might lead us to believe that it is a universal cure-all for all new-growths.

My own experience with this method of treatment is confined entirely to papillomata of the bladder. To the great disappointment of every one who has operated upon these cases, even after a thorough curettage of the bladder through a vaginal or suprapubic opening for a time there is complete relief but after a brief respite there is a recurrence of the bleeding from a regrowth or further extension of the papillomata. Such a patient is now under the care of Dr. John

* See original articles, pages 56 to 97.

Laird, to whom I referred her for fulguration treatment. For more than a year subsequent to a vaginal cystotomy and vesical curettage the patient was apparently well. Then the urine again became slightly blood-tinged and while there has never been a recurrence to the extent that it was at the time of her operation, nevertheless, the patient is again most uncomfortable and naturally is very much depressed over the return of the symptoms. In the treatment by fulguration, the bladder has been mapped out into circumscribed sections, and in one section after another the papillomata have been destroyed, and Dr. Laird now informs me that after several sittings the treatment is about completed.

Another case similar in type which was not submitted to operation but was placed at once upon this treatment is likewise improving. Fulguration, therefore, furnishes a very excellent outlook in this very intractable disease.

Concerning the use of *x*-ray in the treatment of fibroids, I again have very fixed opinions, which, however, may be subject to change by the further study of patients after treatment. I do not believe that patients under forty years of age should be subjected to the *x*-rays. I base this objection upon the fact that each year we lay more and more stress upon the necessity for the preservation of all ductless glands. Certainly the ovary in its potentialities must be ranked as one of the most important glands in the body as regards metabolism and the maintenance of the nervous equilibrium of the patient. It is quite manifest that while exceptionally the ovaries in the younger women are not put out of commission by the use of the *x*-ray, nevertheless, the almost uniform action is to render them functionless.

A few cases have been reported in which there have been a recurrence of the menses after the myoma has disappeared, and in one instance, pregnancy subsequently occurred after this treatment. Isolated cases of this kind, however, are of little value in the discussion because like many other similar incidents in medicine they are reported only because they are unique and merely prove the exception to the rule.

With the American methods of performing a hysterectomy for fibroids the ovaries and even a part of the endometrium may be preserved, and in this way there is no interference whatever with the general nervous and physical equipoise of the patient—a matter which is of extreme moment in younger women. According to my present view, therefore, I am willing to submit to the *x*-ray only those cases approaching the menopause or those beyond forty years of age. The larger tumors, particularly in younger women, should still be considered within the surgical domain. If a radical policy were instituted, namely: the removal of the tubes and ovaries and the entire uterus with the necessarily higher mortality and the disagreeable postoperative convalescence which follows, the question I am sure would be debatable. As I have seen the average hysterectomy done in Germany, where the *x*-ray has obtained such great vogue, I would not hesitate a moment in my choice of the *x*-ray in

preference to the operation, for they are drastically radical in their surgical methods. The average continental surgeon seems to have a morbid anticipation of a malignant change sooner or later in the cervical stump and therefore to obviate this very remote danger does a very extensive panhysterectomy. I am not surprised, therefore, that the mortality percentage rises to 6 and 8 per cent. Such methods certainly do not obtain in the best clinics in this country. It would be most unwise to take up the wholesale treatment of fibroids by the x -ray for I feel certain that within a decade the treatment would be so severely criticised that there would be a tendency to return to surgical methods. There should be no necessity for this, however, for the x -ray has already proved beyond question that it has a definite but limited field.

Within the last three weeks I have seen three patients, all of whom would, I believe, have been injured by the use of the x -ray or any other method of treatment than surgical. In one case there was a calcareous fibroid to which the ileum was adherent and which was producing a partial obstruction. The most optimistic Röntgenologist could not have hoped for any radical change in the calcareous mass; in the meantime, however, there was every chance that the obstructive symptoms which were already threatening might at any moment have become acute, necessitating an emergency operation under adverse circumstances.

In another case, where the patient complained of pain, the fibroid was associated with chronic appendicitis, the appendix containing a small amount of pus. In the third, there was an early pregnancy. The tumors were closely wedged in the pelvis and were producing both vesical and obstructive symptoms. On account of the number of fibroids it was impossible to make a diagnosis of pregnancy. If, therefore, the patient had been submitted to x -ray treatments, the rapid growth of the tumors associated with pregnancy would unquestionably have precipitated a serious emergency operation. I merely refer to these cases in order to point out the dangers of wholesale treatment of fibroids with the x -ray. It is not my desire to detract from but to sustain the method of treatment by the judicious selection of cases. In at least five of my cases of women over forty years of age, whose chief symptom was menorrhagia, the treatment has given ideal results.

As to the use of radium for the treatment of cancer, I am conservatively optimistic. We cannot ignore for one moment the large accumulation of favorable literature which has already come before us, detailing the good results obtained by many investigators. Indeed, the results border upon the miraculous.

Two cases quite recently within my own experience are startling in the quick change for the better. In one, a woman was treated six weeks ago with 85 mg. of radium applied to a cancer in the vaginal fornix, which had formed a crater the size of an English walnut and extended outward to the pelvic wall. An operation was impossible because of the intimate relationship of the ulcer to the ureter. Radium was applied for twenty-four hours. The cancerous

area has shrunk to a shallow pit which does not bleed and is not more than $\frac{1}{2}$ cm. in diameter and the same in depth.

Even a more striking instance—a case of chorioepithelioma seen in consultation with Dr. Erck and Dr. Levi. A considerable ulcer existed in the vaginal fornix at the site of a hysterectomy, and in the left vaginal wall there was a fixed mass the size of a lemon closely attached to the pelvic wall and in direct relationship with the ureter. In this case, a further operation was considered most inadvisable on account of its radical nature and the extreme hazards attending it, with little or no promise of relief. Radium was at once applied and the mass has shrunk to almost indistinguishable remains. After three days, the bleeding, which had been excessive, ceased, and on physical examination cannot be induced. Even though this case should ultimately succumb from metastasis, which is possible, and indeed probable, the result is nothing less than miraculous. These cases, therefore, indicate the value of radium even in apparently hopeless cases, and it behooves us not to look with such extreme skepticism, as is prevalent among many, upon the results reported by so many competent observers but at once to apply this treatment in properly selected cases.

Again, I do not believe that the surgical treatment is abrogated. Indeed, radium should only be utilized in the operative cases as an assurance against recurrence. It must not supersede surgical methods until the data bearing upon its positive value become so convincing that we can no longer feel that we are hazarding the life of the patient by keeping her under this treatment while surgical methods are still possible. One of the advantages claimed for radium is that a preliminary application will limit the growth, stop hemorrhage and foul discharge and thus decrease the dangers of a radical operation.

We now know with great accuracy what we may expect from surgical intervention in cases of fibroid tumors and in the cure of cancer of the uterus. By cautiously advancing from this position we may add materially to our good results through the judicious selection of cases for the application of these newer remedies which offer a hopeless outlook or a too great hazard from surgical treatment. In this way, we may safely extend the domain of successful treatment.

DR. WILLIAM S. NEWCOMET.—I shall have nothing to say about the first few papers as my knowledge about the application of electricity is limited. The same pertains to the paper of Dr. Pfahler. I have treated very few fibroids within the last five or six years and have not kept up with the technic; having had my time fully occupied with other lines of work. However, in the passing of this subject I should like to call attention to a case of Dr. Shoemaker, that came under observation some ten or twelve years ago, of a very large sarcoma of the pelvis. This diagnosis was also confirmed microscopically by the late Dr. J. Dutton Steele. This patient was one of the few to recover, and the fact that the woman became pregnant twice afterward gives us occasion for thought

regarding the sterilization of these patients. From the use of the x-ray directly in the pelvis my interest lately in this locality has been in the inoperable carcinoma occurring within the pelvis. In the last three years a series of fifty cases have been under observation; previous to that, a series of ten cases. In this series of ten cases one patient responded to treatment and this case was reported before the College a few years ago. The amount of radium used was only 2 mg. She began treatment during the winter, and when summer came she wanted to go away upon a vacation. She remained away for about a month when her hemorrhages recurred and she returned for treatment which was continued for the following year; during this time the hemorrhages ceased, and the next summer she again went away. Bleeding recurred again, which again improved under treatment. At this time the disease had to some extent disappeared, although this third summer she remained at home and continued treatment, but in the fall of that year died of acute nephritis. Two others of this series did very well but improvement was not so marked as the one just mentioned. In the later list of cases 10 to 40 mg. were used. These were all inoperable cases. The question of knowing when these patients are well is a difficult one to determine. The nodules studied in one case presented before the College where the soft friable mass had disappeared and taken from around the edge of the scar proved to be carcinoma. This same nodular ridge is often observed in those epitheliomas upon the face which have been healed through the influence of the x-ray. The woman lived in central Pennsylvania and came back last August, unfortunately the demand upon our radium did not permit the resumption of treatment, until there was marked recurrence, and when it was resumed it had very little effect upon retarding the disease. I believe it was a mistake to postpone treatment. I do not believe any man under the sun knows when metastasis begins. In this series of fifty cases three patients are still living who belonged to the far advanced type and two of the milder grade. In the latter cases the uterus had been removed, recurrence followed within a few months, that is, in the scar of the operation. The ulcers were not larger than two or three times the size of one's finger nail. Both cases healed and are still in good health. While a great deal of good may come from the use of radium, I do not believe it is ever going to cure cancer in the general run of cases for the simple reason that the pathologist has not yet found the different degrees of malignancy. A chronic case of malignancy may get well and stay well, but in the acute type nothing will help. The ignorance in the use of the radiation does harm. I heard a few days ago of a man who told the patient to keep very quiet while an applicator was placed upon the abdomen lest she would "shake the rays" as they went through. The mental effect was profound.

Regarding the difference between radium and mesothorium, the radiation from mesothorium is more active than that from radium. And unfortunately the chemistry of mesothorium is so little known,

that a great deal of the supposed mesothorium is not much more than radium. If it were possible to secure mesothorium it would be as useful in the treatment of these cases as radium.

DR. HENRY K. PANCOAST.—We have heard to-night of several methods of treating malignancy—by the *x*-ray, operation, desiccation and by radium, and each advocate I think has spoken mainly of one of these. It is my belief that the best results are often accomplished by a combination of methods. My short experience with carcinoma of the uterus in connection with radium is limited to the cases seen with Dr. Anspach and to one or two others in the surgical service at the University Hospital. One case that I had directly under my care recently was treated first by cauterization and then by the use of radium in the cervix and *x*-ray applications through the abdominal wall. When malignant disease is widespread some distance from the cervix the radium rays will be comparatively inactive at a distance while they may be very active at the point of application. They are many hundred times more active near the tube of radium than a few inches away. Therefore, in a case of this kind I think the *x*-ray should be used in addition, through the abdomen, through the peritoneum and through other points of entry if required. Widespread disease cannot be properly treated unless there is this combination of methods. I can do no more than say that all Röntgenologists who have treated cases of fibroids thoroughly agree with all that Dr. Pfahler has said. Our technic is practically the same as his, although we may differ over minor points, and our results have been the same.

DR. RICHARD C. NORRIS.—This has been an exceedingly interesting meeting and having been taken into the electrical storehouse of knowledge, some of us who are ignorant of the theoretic details of electrical therapy have been very much awed by it. Like all storehouses, this one contains much wheat and some chaff. I think to-night we are willing to accept the wheat and let some of the chaff blow away. Dr. Massey spoke of the use of electrical treatment for relaxed vagina and enteroptosis. I think the time is past to accept the statements of patients or mere clinical data as proof of the results of electrical treatment of the abdominal viscerae, particularly of ptoses of the stomach or intestines. Absolute proof of this can be secured by bismuth and the proper *x*-ray machines and the electrician should be the very one to present such proof. There is nothing so mysterious to patients as treatment by electricity and many cases are recorded such as Dr. Newcomet has mentioned. If I were dealing with electrical treatment I certainly would use the *x*-ray apparatus to confirm my results. Again, while Dr. Massey can, no doubt, by his electrical treatment, help relaxed abdominal muscles, levator muscles torn from their attachments to rectum or pelvic bone are as likely to be restored as would be the recti muscles if they were first severed from the pubis; and it seems idle chaff to speak of curing such conditions by electricity. In the unmarried woman with relaxed muscles in the vagina, if you choose, let that treatment be employed. For the lacerated

fascia and muscles of the pelvic floor, as observed in obstetrics, to hold out the hope of curing them by electricity is not scientific gynecology.

Now as to desiccation. This paper to-night is the best we have had. It was logical, tempered with reason and with discretion. No claims were made which could not be supported. The proper limitations of the method were laid before us and I congratulate Dr. Clark upon presenting a paper with a high degree of merit. When we come to study fibroids and their treatment by the *x*-ray, I am prepared to say there is also some chaff in this subject, but not quite so much as in the first electrical display. You notice that hemorrhage is the prominent indication for the use of the *x*-ray in fibroids, but gynecologists know that hemorrhage is not the only grave symptom of fibroids. Pressure symptoms, degenerations, associated inflammatory diseases of the appendages, and other grave associations of fibroids must be considered. I believe the *x*-ray has its field, but the claim of the *x*-ray treatment is largely that it produces amenorrhea and the menopause.

We formerly produced these by removing the ovaries—an operation long ago abandoned. We recall the earnest electrical battles fought in this society in the past when Dr. Massey urged the Apostoli method and Price, Baer, Goodell and others waxed eloquent in their tirades against such treatment. I believe there is a field of usefulness for the *x*-ray in fibroids, but our best judgment is required to determine the kind of case in which it should be used. That the *x*-ray will displace surgery I do not believe. Its important field at present points to small, profusely bleeding tumors in women who are not good surgical risks.

The *x*-ray and radium treatment of uterine cancer is thus far a treatment of hope rather than achievement. Two cases stand out prominently in my experience which I will mention in detail because they carry the lesson I have in mind. On the same day two patients came under observation with beginning cancer of the cervix. The clinical pictures were identical. Neither had ever borne children. Operation (hysterectomy) was done on the same day. Microscopic diagnosis was identical. Both patients were then treated by the *x*-ray by the same man, the late Dr. Leonard, and were afterward treated with radium. Of these two patients one is well to-day—six years after operation. The other was dead in five months, from recurrence. This means that the pathologist does not yet know the potential pathology in individual cases of cancer. We do not know its cause, nor its clinical and destructive pathological differences. When we shall have this knowledge we may know why in one case the *x*-ray or radium works almost a miracle and utterly fails in another.

Too little radium is in the hands of one man to test its full power. At the present time we do know, unfortunately, that neither surgery, *x*-ray nor radium will cure all types of cancer, and that in uterine cancer, because it may be of the usually late diagnosis, the results are least encouraging.

DR. GEORGE ERETY SHOEMAKER.—I should like to emphasize one point in which the röntgenologist and radiographer has the advantage. He does not in the beginning of his work put an instrument into an active carcinoma. This is one of the ways in which the surgeon has erred in the past. We have got past the point when we put an instrument directly into a breast carcinoma, but not so far that some will not take a piece out of an epithelioma of the uterus without cauterizing the wound deeply and instantly.

Another point is in connection with the disappearance of tumors. The diagnosis of pure fibroid is a harder thing than it seems, particularly to the man who is not working at it all the time. Advocates of the Apostoli electrical treatment used to tell us that fibroids disappeared. A considerable number of abdominal tumors in which a fibroid uterus is involved as an element are composite masses, made up partly of chronic inflammatory tissue, together with tubal, ovarian, or diverticular degenerations. Sometimes inflammatory elements are quite as hard as fibroma elements in the mass.

With months of treatment such masses may shrink greatly in general outline while the fibroma remains the same. The question of definite disappearance of known uncomplicated fibromas must be approached with a certain reserve.

A patient of mine was referred to. The sarcoma developed more than four years after the x-ray course of treatment for fibroma.

DR. MCGLINN.—Dr. Shoemaker asks for a definite information as to the disappearance of fibroid tumors under treatment by Röntgen ray. I have observed two such cases.

One case was a myoma of the uterus as large as a grapefruit. On account of the age of the patient and the condition of the heart, I did not consider her a good operative risk. I referred this case to Dr. Pfahler for treatment and on examination, some months later, the uterus was of its normal size.

The other case was that of a fibroid uterus in a patient who had a very advanced cancer of the breast. This uterus was also about the size of a grapefruit. I operated upon the breast and did not feel that she was in condition to stand an abdominal section. The breast received postoperative treatment by Dr. G. M. Neuberger at St. Agnes Hospital and at the same time I had him treat the fibroid. This tumor also disappeared and the uterus is now normal in size.

DR. MASSEY, closing.—The statements regarding the sinusoidal current in enteroptosis should be taken in the nature of a preliminary report, no radiographs having yet been taken by me, though Dr. Burch, as stated in the paper, has presented this corroborative proof. The clinical results have been so astonishing to me that I hasten to call attention to the value of the method as shown in the improved condition of these patients. These symptomatic evidences of improvement are our best proof after all, though radiographs are desirable.

As to the Apostoli treatment, good results were obtained in the

cases criticised by the late Dr. Price, though a shorter treatment is now possible with the assistance of the Röntgen ray. Circulars were sent to these patients ten years later, about 1903 I think, and they were all then alive and well and I have heard of no deaths since. This circular elicited the fact that an astonishing number of these fibroid tumor patients had lost their husbands since seeing me—husbands who had brought their wives to me under the impression that the wives had a mortal affection demanding a serious operation—it being most interesting to note that these ladies were in the enjoyment of good health while the husbands themselves had passed away.

DR. WILLIAM L. CLARK, closing.—Dr. Newcomet is quite right in his remark that cancer cannot be accurately classified as “localized” and with “metastasis,” for frequently when we feel almost sure there is no glandular involvement, and take a chance with a conservative operation we find that, glands which before operation were not palpable, became involved at a later date.

The classification which is formulated in my paper is an attempt at a working rule for personal guidance.

DR. WILLIAM S. NEWCOMET.—What I meant to say in regard to metastasis was it was impossible to give its limitations. When I first took up x-ray work many sections were studied, made long after the time of healing, for instance in epithelioma that were apparently healed, the scar tissue still showed presence of the disease. By this I am led to believe that pathologists cannot tell us when or where the line of demarcation between diseased and sound tissue take place.

REVIEWS.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES, embracing the entire range of Scientific and Practical Medicine and Allied Sciences. By various writers. Third edition, completely revised and rewritten. Edited by Thomas Lathrop Stedman, A. M., M. D. Complete in eight quarto volumes. Volume V, 923 pages, illustrated by 733 engravings and 6 full-page plates in black and colors. William Wood & Company, New York, 1915.

The fifth volume of this authoritative work of reference covers the field alphabetically from “Head, Wounds of,” to “Life Insurance Medicine.” Of particular interest to the readers of this journal are the articles on hebosteotomy, impregnation, labor, leukorrhea, hematocele, hemorrhage, hysteria, hysterectomy, intestinal surgery, and the kidneys. Hernia is discussed at length by Blake and heredity by Bigelow. The principal papers on pediatric subjects are those on heliotherapy, hydrocephalus, tests of intelligence, intubation, knock-knee, lateral curvature of the spine, infancy and artificial feeding of infants. In the last article the author dwells chiefly upon modification by the use of top milk. Many articles of general in-

terest are included in this volume. Among these are that on histological technic which contains much useful information; practical papers on hospital construction, equipment, organization and management; one on hospital ships, and others on house sanitation and military hygiene. Baruch writes on hydrotherapy. Artificial hyperemia is another important subject. Among the papers of pathological interest are that by Park on immunity, by Ziusser on infection, and by F. C. Wood on inflammation. Dresbach presents a lengthy article on inhibition. The papers on insect carriers of disease, parasites and poisonous insects are worthy of particular mention. Much space is devoted to articles on the larynx. It may seem unfair and invidious to select these papers from among the many of particular excellence, but in a work of this caliber only a few of the longest and most striking can be mentioned. The current volume contains 484 separate articles by 123 writers and is fully up to standard. H. D.

OBSTETRICAL NURSING. A Manual for Nurses and Students and Practitioners of Medicine. By CHARLES SUMNER BACON, Ph. B., M. D., Professor of Obstetrics, University of Illinois and the Chicago Polyclinic; Medical Director, Chicago Lying-In-Hospital and Dispensary; Attending Obstetrician, University Chicago Polyclinic, Henrotin, German and Evangelical Deaconess Hospitals. 12mo, 355 pages, illustrated with 123 engravings. Cloth \$2.00 net. Lea & Febiger, Philadelphia and New York, 1915.

To the large number of books on obstetrics intended for the use of nurses has lately been added another by Professor Bacon. It is also stated that the present work is intended for students and practitioners of medicine. Whether it is advisable to include all of these under one designation is a question for honest differences. It would seem as if a distinction should be made between the nursing art as practised in obstetrics and the necessary knowledge of this subject demanded of the physician. Without question a nurse can practise her profession better if she knows the elements of the various branches of medicine for which she undertakes to provide bedside care. It is questionable, however, whether such knowledge as imparted in the training schools has anything more than a transitory value. In obstetrics, perhaps more than in other branches, nursing constitutes a very important part of the art and this should be understood by the physician as well as the nurse. The author presents the subject in a series of chapters devoted to anatomy, physiology, pregnancy, labor, puerperium and new-born infant, prefaced by several introductory chapters relating to the nurse's duties to herself, the doctor and the patient. These introductory chapters constitute the most interesting and valuable portion of the book and might well have been elaborated to a larger degree, as these features of obstetric nursing are usually slighted by the members of this profession. The author also presents fairly detailed accounts of the processes of labor and the various features connected therewith. He directs particular attention to the details of abdominal and vaginal examination, including even a reference to the recognition of pelvic

abnormalities. It hardly seems reasonable for a nurse to be required to acquire this knowledge, as the interpretation of the same, even by the practitioner of medicine, is not necessarily a simple matter. There is so much else for an obstetrical nurse to do in the conduct of her case that she seems unnecessarily burdened with the acquirement of such information. Moreover, most patients would decidedly object to an opinion as to their condition during labor based on a nurse's examination. It is not fair to the nurse to saddle her with such responsibility and it is only in a few exceptionally well-trained women that this knowledge can be acquired or made proper use of. It may be stated that Dr. Bacon in his recent work has considered the various nursing features of obstetrics in a more detailed and satisfactory manner than is usually the case in the ordinary text-books on obstetric nursing which, written by practitioners of medicine, approach the subject rather from this standpoint than from that of the nurse, whose attitude must necessarily largely differ from that of the physician.

CYSTOSCOPY AND URETHROSCOPY FOR GENERAL PRACTITIONERS.

By BRANSFORD LEWIS, B. S., M. D., F. A. C. S. Professor of Genitourinary Surgery, Medical Department of St. Louis University, St. Louis, Missouri; Genitourinary Surgeon to St. John's Hospital and so on; and Ernest G. Mark, A. B., M. D., F. A. C. S. Professor of Genitourinary and Venereal Diseases in the University Medical College, Kansas City, Missouri, and so on. With a chapter by William F. Braasch, M. D., Attending Physician to the Mayo Clinic, Rochester, Minnesota. pp. 238. With 113 illustrations, twenty-three of which are printed in colors. Philadelphia: P. Blakiston's Son & Company: 1915, Cloth, \$4.50 net.

The authors have succeeded in portraying the technic of cystoscopy and urethroscopy so simply and graphically that the book will be of value to the novice as well as to the expert who wishes to study the methods of others than himself.

Free use is made of photographs and diagrams for illustration of all the steps and phases of the subject, so that one gets a fair understanding of these even if he only follows the figures.

The chapters treat of the anatomy of the bladder, the cystoscope, the operative technic, ureteral catheterization, uretero-pyelography, cystoscopy of the diseased bladder, operative cystoscopy, the anatomy of the male urethra, development of the urethroscope, urethroscopy of the normal urethra, urethroscopy of the diseased urethra, and operative urethroscopy.

PAINLESS CHILDBIRTH. A General Survey of all Painless Methods with Special Stress on "Twilight Sleep" and Its Extension to America. By MARGUERITE TRACY and MARY BOYD. With 19 illustrations from photographs. New York, Frederick A. Stokes Company, 1915.

Books on medical topics by nonmedical writers no longer present the character of novelty. One estimable gentleman has shown the

world how proper chewing of food may contribute to a long and happy life. Coming from his pen these directions attracted universal attention, although every medical student learns this fact among the principles of medicine that are taught him and he undoubtedly enjoins his patients later on accordingly. It is only when surrounded by the glamour of the lecture platform and within cloth-bound covers, with a direct appeal to the laity, that such directions seem to meet with attention. Numberless other health topics of a similar character written by persons who have no other qualifications than those assumed by themselves are on sale in the bookshops. Undoubtedly, these works have done some good. Their subject matter is presented in a form that appeals to the imagination and thus falls on fertile soil. Whether they should be accorded the benefit of criticism in the pages of medical journals is a doubtful question and it is with this thought that the book herewith noted is taken up for consideration. Why two lay women, one of whom is confessedly in a state of single blessedness, should be in a position to present from personal and journalistic experiences a critique of this most important function of life under the special auspices developed by their German heroes, is something that we cannot readily answer. Perhaps we can arrive at a compromise by not discussing the medical aspects of painless childbirth, but rather limit ourselves to a discussion of the book as such. As a literary and artistic work it has much to commend it. The English is good, and the authors present the subject in an entertaining form that will appeal to most people who mold their thoughts on statements made by others without themselves undertaking to prove their truth or falsity. Artistically the work may likewise be commended as presenting a series of very attractive photographs of babies in arms and swaddling clothes, whose particular claims to good health seem to be based on the fact that their mothers were unconscious of their arrival. A view of the Freiburg Hospital, the fountain-head of "twilight sleep," is also presented and the many complimentary references to the two most prominent advocates of the method suggest that their own likenesses should have been included.

The assurity with which the authors attack the subject makes it appear as if the medical profession had been and is derelict in its duty unless it advocates the method. There is very little said about contraindications and the average woman reader would necessarily infer that "twilight sleep" in the birth of her baby was as much of a necessity as providing herself with certain necessary articles of apparel during this period. What effect this will have on women as a class the future must be left to decide, but the fact that in this country at least the method has not proved such a boon as we would be led to believe from the publications of foreign experimentors, has already produced a reaction. The most enthusiastic advocates of the procedure have begun to limit its application and with few exceptions do not seem to be carried away as they were at first by the apparently good results obtained. The authors, however, evidently intend to convey to their readers the belief that childbirth

can be rendered absolutely painless and fail to insert any qualifying clauses in this statement. The state of mind which has been reached by them is well shown in the concluding paragraph of the introduction: "it is, as far as we know, the first time in the history of medical science that the whole body of patients have risen to dictate to the doctors."

In presenting their plea one would think that misrepresentation was the only method employed to combat the growth of this procedure. They do not seem to think that there is any honest criticism in opposing the same. Moreover, the facts of physiological uterine involution are entirely cast aside in the statement that "twilight sleep" patients are ready to get up and be about on the second day. A few sudden deaths from emboli will, if conscientiously noted and reported, soon put an end to this fallacy.

One is impressed on reading this book with the frequent reference to the necessity of carefully following out the details of the Krönig and Gauss technic, especially the use of the particular preparations of the drugs employed in Freiburg. By comparison with the same the various other methods advocated are apparently of little value. Considered without prejudice, the manner in which the entire work is written savors so much of the medical testimonials familiar in our periodic literature, that one is less inclined to give proper consideration to the method than if the topic had been presented in a more rational and less "literary" manner. The several glaring inconsistencies of fact which the book contains need not be referred to in detail here; they will at once become apparent to the medical reader and will lead him to the conclusion that perhaps only one viewpoint was followed in the writing of the same. In view of the fact that the work has been written by lay persons, any critique of the "twilight sleep" in this connection would be inappropriate and inopportune. We can merely refer to the book itself as an attempt to force upon the public a certain method of treatment which has by no means proven acceptable or satisfactory to those members of the medical profession who are not readily misled by claims that, charitably speaking, are either overdrawn, false or inaccurate. The wide newspaper notoriety which has been accorded to the subject of "twilight sleep" will undoubtedly result in the sale of a great many copies of this work to the laity. Whether it will help a woman in her decision, the practical experience of the future must decide.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Hyperemesis and Other Forms of Pregnancy Toxemia.—E. H. Tweedy (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxvi, 216) reports a case of pernicious vomiting as furnishing proof of the close relationship which exists between this form of pregnancy toxemia and the ingestion of milk or other food stuffs, whether carbohydrates or proteids. Food and fluid by mouth were discontinued; a full dose of castor oil was given and vomiting and other toxic symptoms rapidly subsided. Tweedy believes that absorption of food particles during the earliest stages of their digestion are the responsible agents in hyperemesis and eclampsia. In early pregnancy a foreign albumin appears in the blood, and Tweedy suggests that the normal food antibodies are interfered with thereby. Thus the early sickness of pregnancy may be considered nature's effort to reject food incapable of proper neutralization. It is also probably eliminatory in its effects, for its occurrence in the early morning will remove from the system the digestive excesses of the previous day. When it fails to do this thoroughly toxic symptoms arise. In most instances tolerance to food is eventually established, but the extent of the failure of the food particle to unite with its antibody is the measure of the severity of the toxemia. The fact that kidney inflammation is rarely seen in the early months of pregnancy may be due to the efficient eliminatory action of morning vomiting. In the worst cases of hyperemesis the alarmed stomach fails to discriminate between harmful and harmless stimuli, and endeavors to reject everything.

Diagnosis of Pregnancy.—R. H. Malone (*Jour. A. M. A.*, 1915, lxiv, 1651) describes a simple method based on the passage of specific enzymes through the kidney as suggested by Kintsi. The latter, while indicating the broad outlines of this method, is careful not to give any details regarding the preparation of his dried placental substrate, and has avoided pointing out the precautions which have to be taken to obtain uniform results. This has been worked out by the writer, who describes his own technic in detail. Having obtained the dried placenta, the test is applied as follows: A freshly passed specimen of urine from a pregnant woman is tested for albumin by the biuret test. If the test be positive, 15 c.c. of urine are shaken with 0.3 gram of kaolin for ten minutes in a mechanical shaker, filtered and tested again; the biuret test should now be negative. If it be still positive, the process must be repeated. Ten cubic centimeters of biuret-negative urine are then neutralized with either 1 per cent. acetic acid, or 2 per cent. sodium carbonate solution, 0.2 gram of dried placenta added, and the whole well shaken. The shaking is

essential. Five-tenths cubic centimeters toluene is added to restrict bacterial growth. The mixture is incubated for twelve hours, filtered, and 5 c.c. tested by the biuret test. If negative, the remaining 5 c.c. are left in contact with the substrate, incubated for four hours longer, and tested again. Since using the kaolin method, and adopting the precautions mentioned the following results have been obtained. Pregnant females, 29, all positive; males, 6, all negative; nonpregnant females, 9, 8 negative, 1 positive (fibroid of uterus); ectopic gestation, 3, all positive. These positive results in pregnant females were gained in the main from urines of cases estimated as from the twenty-eighth to the thirty-sixth week of gestation. Two cases were at about the third month. As compared with Abderhalden's delicate and complicated serum test for pregnancy, this method is both simple and expeditious.

Nitrous Oxide Analgesia in Obstetrics versus Scopolamin-morphine Seminarcosis.—Citing the disadvantages of scopolamin-morphine seminarcosis, F. W. Lynch (*Chic. Med. Rec.*, Mar., 1915) reports that he has employed nitrous oxide gas for analgesia in thirty-seven obstetric cases. The gas is given to produce analgesia, not the deeper stages of anesthesia. Contrary to the action of chloroform and ether, gas stimulates the second-stage pains, nor does it alter their frequency nor favor postpartum hemorrhage. There are no bad effects for mother or child. Children delivered by Cesarean section or through the natural channels during gas are not anesthetized to the degree obtained under chloroform or ether. The gas is started when the pains are severe enough to occasion complaint. It has been used for from two to six hours without complication. Analgesia is established within a few seconds and continued only throughout each pain. The pulse is not abnormally altered nor the fetal heart influenced appreciably. The cheapest results are obtained with any instrument which has a stopcock permitting the admixture of gas and oxygen, and a nosepiece such as is used by dentists. At the beginning of the pain pure gas is turned full on and the patient told to breathe through the nose. A few rapid respirations obtain analgesia. The stage is the one just before the dilatation of the pupil. The nosepiece is then removed and placed over the mouth, while breathing is through both mouth and nose. The gas is diluted with oxygen at this time. The more uniformly the stage is maintained the more safe and successful the application. Consciousness is not lost, although it is somewhat disordered. It is perfectly feasible to maintain this stage even when the head passes over the perineum, yet progress cannot be controlled without deeper anesthesia since the gas in analgesic doses stimulates the pains. The anesthesia is therefore carried to deeper degree, maintaining the proper color by the use of oxygen. The rapid advance may be thus properly retarded. Under ordinary circumstances, after some experience is acquired in the method, the cost will run from three to five dollars per hour. Lynch believes that this method will supplant the use of scopolamin and morphine in the private case.

It is adapted to work in the private house and carries none of the dangers of ether, chloroform or the narcotics.

The Coxalgic Pelvis.—The feature of the coxalgic pelvis is its asymmetry due almost entirely to alterations in the innominate bones. It is commonly the product of unilateral hip-joint disease with ankylosis in childhood; and occasionally the cause of a severe dystocia in the adult woman at, or about, the full term of pregnancy. H. Briggs (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxvi, 212) records five cases, all with lateral tilting of the pelvis. In each the left half of the pelvis, the diseased side, was raised. In four R. O. A. and in one L. O. A. were recorded as the positions of the vertex presentations. Natural delivery occurred in two, forceps delivery in one, induction in one, craniotomy in one. The conclusion is that the diseased side is raised and that the mechanism of labor is thereby favorably influenced in the moderately contracted coxalgic pelvis.

Pituitary Extract in Obstetrics.—J. M. H. Rowland (*South. Med. Jour.*, 1915, viii, 394) issues a warning against the indiscriminate use of pituitary extract in obstetrics. He states that it may, in a considerable percentage of cases, be used to induce labor at or near full term. A small percentage of cases may show toxic effect. Its usefulness is limited in the first stage of labor; but is very great in the second stage of labor, growing greater the closer relation its administration bears to the end of the second stage. It should probably be used with caution in the cases usually accompanied by high blood pressure—such as preeclamptic toxemia, eclampsia and nephritis. It should never be used when there is marked disproportion between the child's head and the mother's pelvis, or in any case where there is serious obstruction from any cause. When combined with careful preliminary examination and close observation of the progress of labor, it will avoid a large percentage of operative deliveries. There is less bleeding in the third stage and after the delivery of the placenta, and the third stage of labor is shortened. Version should not be attempted during the two hours following the administration of a pituitary preparation, except in cases where there is entire failure on the part of the uterus to respond to the drug.

Pregnancy in the Rudimentary Horn of an Atresic Bicornuate Uterus.—A. Pinna Pintor (*Ann. di ostet. et gin.*, March, 1915) says that an atresic condition of one horn of a bicornuate uterus is an unfortunate one for pregnancy, if the ovum is located in the rudimentary horn. Rupture of the uterus is likely to occur when the fetus grows. In a few cases the fetus may become encysted or calcified and the immediate danger be over. The differential diagnosis of this condition from various other pelvic affections is difficult. The author details the history of a case observed by himself. Rupture of the sac may occur at a very early period of pregnancy, as early as the end of the first month. There may be defect of the lining mucosa which cannot transform itself into a decidua, with consequent destruction of the villi and death of the fetus. There may be a preponderance of the connective tissue in the wall of the uterus, and a small amount of muscular tissue, making rupture easy, or by com-

pression preventing development of the fetus. Or there may be a proper amount of muscle and mucosa so that the development may go on normally to term. The abnormal location of the ovum, and abnormality of the placental evolution cause an insufficiency of nutritive exchanges between mother and fetus, and this is the principal cause of the death of the fetus. The author's case was operated on eight months after the death of the fetus judging by the reappearance of menstruation in the other horn, and cessation of the subjective symptoms of pregnancy. There was no amniotic fluid; the fetus was much compressed in the cavity, and death had resulted from pressure and failure of nutrition. In such cases operation is demanded to insure the future of the patient, while in cases of threatened rupture it becomes imperative to preserve life.

GYNECOLOGY AND ABDOMINAL SURGERY.

Distribution and Significance of the Parametrium.—The importance and significance of the connective tissues of the female pelvis were almost completely overlooked by the older anatomists. That it is the round ligaments—the uterosacral and broad ligaments—that hold the uterus in position has been for many years a tradition among gynecologists.

M. Moritz (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxvi, 178) has therefore obtained fresh material from the postmortem room. Only the pelves of adult women, free from pelvic disease, were used. The pelvic contents were removed as soon after death as possible. The pelvic contents were cleared out *en masse* right down to the bone, and the pelvic floor cut away with them. The viscera were then as far as possible placed in their normal positions and the whole pelvic contents and pelvic floor suspended in a 10 per cent. solution of commercial formalin. After a few days, sections were cut in varying planes and directions. He also examined a series of thin sections of a full-time fetal pelvis cut in a transverse plane and an injected section of a female pelvis, oblique in two places, laterally and antero posteriorly, and cut in a transverse axis. Methods of dissection are quite useless for the purpose of gaining a true idea of the real nature and the relations of the pelvic connective-tissues. In addition sections were cut of female pelves of various lower animals. The writer describes the relations and course of the connective tissue of the pelvic cavity. "Mackenrodt's ligaments," he says, are simply a few strands of the original connective tissue around the lower branches of the uterine arteries teased out by hand. The uterus is surrounded, both behind and scantily in front, by connective tissue. Laterally the tissue forms a triangular mass with its base below diminishing in thickness from before backward. As it extends upward it swells out again at a level where the round ligaments and ligaments of the ovaries pass through it, and finally ends below the Fallopian tubes. The subperitoneal cavity and base of the broad ligament, filled up in the fetal condition by a cellular matrix of undifferentiated mesoblast, loses its fat and becomes

a dense fibro muscular tissue with fixed and definite directions. The fibers offer definite directions, taking as such the branches of the uterine arteries for which they form dense perivascular sheaths. The tissue at the sides of the lower uterine segment, especially where it has been known as parametrium proper, appears to be stratified, as if it consisted of superimposed layers of muscular bands attached to each other, running into the uterus and spreading out and forming sheaths for the obturator internus, part of the pyriformis and the pubo coccygeus muscles. No separate bands or layers, such as have been previously described, exist. The lower uterine segment is fixed and held in position by tier upon tier of dense connective tissue. This is the most compact part of the parametrium. The masses of smooth muscle in this situation, though differing only in degree as regards strength from the remaining tissue, are arranged in a definite manner along the branches of the uterine artery and ureters. Higher up the tissue is continued uninterruptedly between the layers of the broad ligament to the ovary and Fallopian tube, and outward along the round ligaments to the groin. The unstriated muscular fibers are in the form of bands extending from the sheaths of the muscles lining the pelvis to the viscera and lower uterine segment especially. The pelvic connective tissue forms the vascular pedicle of the pelvic viscera. The densest part of this tissue is situated around the cervix uteri, and therefore that is the most fixed point of the uterus. The chief blood supply to the uterus lies just below this area. The result is that the uterus is enabled to undergo the remarkable physiological changes to which it is subject without interference with its vascular supply. Examination of lower animals, tailed monkeys and anthropoid apes show that the higher up we go in the scale the richer this tissue becomes in smooth muscle and the better it thus is adapted to the mechanical duty of keeping the pelvic viscera in position. Also the chief supporting elements of the tissue are developed conversely as the pelvic floor becomes more sphincteric in its action, and is less used for the purposes of movements of the tail. Criticisms against the importance of this tissue as a supporting agent may be classed under the following headings: (1) It has been asserted that the so-called ligaments of the uterus are the chief supports. This view has been disproven by the fact that the round and broad ligaments may be cut without giving rise to prolapse of the uterus. (2) So-called "intraabdominal pressure." In cases, however, in which the abdomen has been opened and in which for some weeks there is practically no tone in the abdominal wall, no prolapse or descent of the pelvic viscera can be observed. (3) The part played by the pelvic diaphragm. Its sloping, shelf-like shape is such that without the intervention of the pelvic connective tissue it would practically exert no supporting action. The fact that this tissue forms the sheaths of the levator ani, compressor urethræ, and deep transversus perinei muscles, causes them to have a secondary relationship to the pelvic viscera. Thus its influence on the pelvic viscera is very slight and purely secondary. Cases of extensive perineal tear, without any prolapse of the pelvic viscera, are common.

During the common operation of paravaginal section, in which the pelvic floor is completely put out of action owing to the section of at least one-half of the perineal muscles, prolapse of the pelvic viscera has never been observed, and the position of the pelvic viscera is not in the least influenced. The old experiment of dividing the round and broad ligaments and removing the muscular layers of the pelvic floor in the cadaver without in any way effecting the position of the uterus may be mentioned. These observations, excluding all the other elements, leave therefore the vessels, nerves, lymphatics and ureters, with their sheaths of smooth muscle, alone, together with the retroperitoneal connective tissue in which they run as the only factors which come into consideration in regard to the support of the pelvic viscera. In addition to its advantages over a more rigid tendinous or ligamentous support, this tissue possesses a definite tonus of its own. It is actively contractile, ever variable in dimensions, and thus able to arrange itself for the varying conditions to which the pelvic viscera are liable, enabling these to carry out their functions comfortably and with the least expenditure of space and energy.

Origin and Phylogenetic Significance of the Female Genital Passages.—From observations which it is impossible to give in abstract, S. E. Wichmann (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxvi, 190) formulates the following theory: "The Müllerian duct in man and mammals, as in amphibians and reptiles, originates from a diffused epithelial blastema, which in the phylogenesis is derived from the epithelium nephrostomale of the tubulus complementarius of the pronephros."

The fimbria ovarica originates from the cranial part of this blastema and the appendicular formations situated in later stages on the anterior surface of the mesosalpinx from its caudal end. All the appendicular formations existing on the posterior surface of the mesosalpinx are fragments separated from the fimbria tissue in about the third month of pregnancy. Contrary to the opinions expressed by all earlier authors the writer also, derives all the appendicular formations from this blastema.

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DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS.

HEART DISEASE IN CHILDHOOD.*

BY

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THE frequency with which organic lesions of the heart have occurred in children under my observation of late has emphasized the importance of this subject and suggested a topic for presentation to this society, with the special hope that a full discussion may be provoked.

The etiology of endocardial lesions is very varied. It is apt to occur in any acute infection, wherever located; it is closely related to that vague, indefinite condition which we call rheumatism for want of a better name, and occurs as a complication in diseases of the tonsils, nasopharynx, teeth and gums.

Just here it may be well to emphasize the frequent absence of typical adult symptoms of rheumatism in a child. Severe endocardial lesions often develop in childhood in which there are but few or no recognizable rheumatic joint lesions, perhaps only a recurrent tonsillitis, yet a severe involvement of a valve may occur. Another phenomenon which it is important to bear in mind is the fact that a murmur may appear between visits, or *per contra* the murmur present at one examination may not be found at the next visit. This is an occurrence I have noted several times and is one which I have known to be used by a consultant very much to the detriment and disadvantage of the attending physician. This is mentioned only to deprecate such unprofessional relations between consultant and attending. If he locate a murmur not previously found by the attending the fact that it may have been present but a few hours should be borne in mind and so stated.

Systolic apical murmurs occur during any febrile disease, then

* Read before Medico-Chirurgical Society, April 23, 1915.

disappear without leaving any evidence of organic lesions. It is in these cases, though, that we may expect severe myocardial changes and they call for longer confinement to bed than is usually the case.

The location of the lesion may be a diagnostic point as to the time of the involvement, for instance right-side lesions in infancy and childhood indicate a fetal endocarditis of septic or rheumatic origin.

Radiography in diagnosis of heart lesions, especially congenital displacements should be considered and made use of. Keinbock(1) considers the placement of the tube as of importance, suggesting 50 cm. from focus to plate in small children, and 60 to 80 cm. in larger children. The x-ray is considered of value in diagnosis of dilatation of the pulmonary artery, of aneurysm of the aorta and pulmonary artery, and of pulmonary stenosis.

An extended study of congenital cardiac disease is reported by Dunn(2) of Boston. He lays down the following rules for differential diagnosis: (1) A case showing cyanosis with enlargement of the cardiac dulness or palpable thrill, or both, is one of pulmonary stenosis. If the baby dies shortly after birth, the most probable lesion is pulmonary stenosis alone. If the baby survives early infancy, or lives on into childhood, the pulmonary stenosis is probably associated with some other lesion. If the murmur is notably transmitted into the vessels of the neck, or if a "humming top" murmur is present, the additional lesion is probably open ductus arteriosus. If the murmur has neither of these characteristics, the complicating lesion is probably defective interventricular septum. (2) A case showing a murmur and enlargement, without cyanosis, is probably defective interventricular septum. If the murmur is not transmitted into the vessels of the neck, this lesion exists alone. If the murmur is so transmitted, or if the "humming top" murmur is present, the lesion is probably combined with open ductus arteriosus. (3) A case showing a murmur, without either cyanosis or enlargement, especially if the murmur is markedly transmitted into the vessels of the neck, or if it extends into diastole, is probably one of open ductus arteriosus alone. If the murmur is of the "humming top" variety, extending throughout the cardiac cycle, the diagnosis of this lesion is almost certain.

I have seen but two children which could be classed as typical blue babies, both dying before six months old. In both of these there were the typical symptoms of patent foramen ovale, continued cyanosis, worse on crying or exertion, and the clubbed fingers.

It should be borne in mind that a rheumatic infection of the heart may not be limited to the endocardium. Myocardial inflammation

due to rheumatic reinfection may show in the form of nodules (Aschoff bodies), and when located in the interventricular septum close to or involving the bundle of His may be the cause of interference with ventricular contraction.

The effect of rheumatic or any septic infection on the heart muscle is too frequently overlooked. The heart muscle is very regularly affected even though the endocardium or pericardium are not, and the heart muscle should always be very carefully watched in infections of all kinds. This is especially true in rheumatic infection. Our usual thought in regard to the rheumatic heart lesion is that it must be an endocarditis, when in point of fact the heart muscle is quite as regularly, if not more often, affected.

Primary pericarditis is quite infrequent in children from the second to seventh years of age. Among the causes given are infections of any kind, the exanthemata, erysipelas, nephritis, inflammatory conditions in the abdomen, pneumonia and tuberculosis.

I have recently had under observation in the children's ward of the City Hospital a case of pericarditis with effusion, later complicated with an endocarditis permanently involving the mitral orifice. This child was seven years of age and the only history obtainable was of several attacks of subacute rheumatism and recurrent tonsillitis. There was complete absorption of the pericardial effusion and no evidence left of pericardial inflammation or adhesions, though the mitral regurgitant murmur remains.

Rheumatism in a child is essentially a chronic condition, or at least a condition in which there are frequent and more or less severe flareups. Every case of rheumatism especially those involving the heart should be watched closely as to whether there is an irregular temperature, which if present is indicative of an endocardial involvement.

Palpitation, syncope, cyanosis and pain or distress over the region of the heart are present in a myocarditis, and these symptoms when associated comprise a danger signal which should be carefully taken into account. *Per contra*, it might be mentioned that but few subjective symptoms may be noted in severe endocardial involvement.

A possible cause of heart disease in childhood is too much and too violent exercise. Competitive games, long runs, and violent exercise in any form in the young may result in serious harm. Too sedentary a life may also result seriously. An endeavor should be made to strike the happy medium.

The question of blood pressure in childhood, and its utility as a clinical aid has been discussed by various authors, with the general

opinion prevailing that it is of no very great value in a child, from any standpoint, especially when five years of age and under.

Wolfensohn-Kriss(3) made observations on the blood pressure in 350 children, from a few weeks old to fourteen years, and gives the variations as between 80 and 113 mm. of mercury. He concludes that blood pressure in children increases in direct proportion to age, size and weight; that age alone exerts no influence, laying stress on weight and size; that sex exerts no influence, provided weight and age are the same.

Hoobler (4) has devised a method whereby the systolic and diastolic pressures can be visibly and automatically recorded the instrument being called the plethysmograph.

Pisek and Coffen(5) look with favor on the use of the polygraph in the study of heart cases in childhood claiming that it enhances the value of careful physical examination, and demonstrated that satisfactory tracing for diagnosis can be made in children.

The prognosis of heart disease in childhood is entirely an individual problem, though there are enough cases on record which have been a long time under observation to establish in a general way an idea of what may be expected in these cases. Dunn, for instance, as a result of a study of 300 cases in Boston Children's Hospital,(6) states the immediate mortality of rheumatic cardiac disease is 20 per cent. subsequent mortality of patients subject of rheumatic endocarditis followed for at least ten years is 60 per cent., and the mortality after young adult life about 7 per cent.

The cause of death may be due directly to the heart infection, especially when the myocardium is chiefly involved; to ruptured compensation this occurring more often in young adult life, to an acute infection taking place in a child in which compensation has been temporarily established, or to a secondary pulmonary or kidney affection. A child subject to frequent rheumatic reinfection is very apt to have a poor chance for reaching even young adult age. But one who has had an endocarditis in early infancy with a permanent lesion following, and reaches puberty without ruptured compensation, may live for a number of years without any evidence of a serious heart lesion existing. This is unquestionably due to the perfect adaptation of the child to the crippled organ and *vice versa*, resulting in a perfectly balanced compensation.

During 1913 and the early part of 1914 I had under my care a girl of thirteen whom I had been seeing more or less frequently for about five years. She was to a superficial observer a strong, robust rather obese child, with anemic tendency which was apparent to anyone.

Her history was interesting. At three years she had had a pneumonia and empyema, the latter necessitating a rib resection. She had been a delicate baby with much feeding difficulty. I was called first to attend her in an attack of typhoid fever, which was quite severe, complicated by a pneumonia and an endocarditis, involving the mitral valve. Leaving for Europe about this time I left her in charge of Dr. Sidney J. Meyers during the acute pneumonia, endocarditis and subsequent convalescence. Her convalescence was slow, but steady and satisfactory. She had rather frequent attacks of tonsillitis, which, while never very severe, unquestionably added to her disability. Tonsillectomy was frequently mentioned but never accepted as necessary.

About six months before her death she had a severe tonsillitis, followed by a lobar pneumonia, and a recurrence of the endocardial murmur, which had previously entirely disappeared. Her condition during this time was extremely critical, ruptured compensation frequently threatened but never occurring. About this time she was taken to Chicago to consult Dr. Robert H. Babcock, who at once strongly recommended tonsillectomy under ether anesthesia. After a few days' rest this was done, the child suffering no shock and apparently none the worse for this ordeal. She apparently improved after this, returned home and later went to Florida. About this time the family adopted Christian Science, later taking the child to New York, abandoning medical care. In a short time she became waterlogged, great edema of the extremities developed, spontaneous rupture of skin in many places occurred, and she died rather suddenly probably of pulmonary edema.

I briefly refer to this case to remind you of the importance of age of the child as a factor influencing the prognosis in a case of heart disease. The age of puberty seems to exert a special tax upon children the subject of endocardial inflammation but if they survive this period they may live with perfect compensation for many years. They may even survive severe infections, such as pneumonia, but the presence of an endocardial inflammation with the frequent myocardial inflammation associated with it, renders the prognosis extremely grave. Hence, it behooves us to be most careful in the expression of an opinion as to the possible outcome in an endocardial inflammation when observed in children under twelve years of age. To tell the parents the child will probably outgrow the condition is cruel and untrue, for it lulls them into a false sense of security and the child is allowed to do many things which if not indulged in might add many days to its life. It is a fact, however, the earlier the endocarditis occurs, the better the prognosis, as it has a much longer period to develop compensation before a serious strain is put upon it. As Crandall puts it the heart and the child grow up together and are

more apt to adapt themselves to each other than they do in later years.

There is one phase of the subject of heart disease in childhood upon which I have been unable to reach a satisfactory conclusion. I refer to the so-called functional troubles, irregularity and intermittency of the heart. I have under observation now a boy of thirteen without valvular lesion or a demonstrable myocardial disease, who persistently has an intermittent pulse, frequently being very regular in the intermittency, losing every fourth beat. This is the same by auscultation as by palpating the pulse. He has no more respiratory difficulty on exertion than the normal boy, though there may be a slightly more frequent pulse. Acting on the hypothesis that it was likely due to an intestinal condition I have had him on all kinds of diet, so-called intestinal antiseptics and digestants but without effect.

In such a case as this and they are by no means infrequent what is the prognosis and what the general routine of treatment best adapted?

Zahorsky(7) reports two interesting heart cases in infants. The first fifteen months old presented typical symptoms of heart block. The pulse rate was 54 and a loud systolic murmur was heard over the entire chest. Over a period of one year there were several attacks of fainting and cyanosis, with a continued slow pulse.

The second case was one of paroxysmal tachycardia, in a child of three, with a pulse of 200, the reporter seeing the child in several attacks of the same nature. He refers to one other case reported by Robert Hutchinson(8) in a child a little under three years of age.

In this connection it is of interest to note that Pfaundler and Schlossman in their text-book state that "very rapid pulse (*pulsus celer*) does not occur in childhood."

As to the treatment of heart disease of childhood, no hard and fast rules can be laid down. Many factors must be considered. The etiology must be carefully weighed and cause removed when possible. Bearing in mind that an infection is responsible either active or latent, its source must be found.

The rôle which the tonsils play in the etiology of the recurrent rheumatic type of the infection is most important, and if they are diseased they should be removed. I am not an advocate of the universal slaughter of the tonsils, but believe most emphatically that in the presence of a rheumatic endocarditis the tonsils should be removed if the least enlarged. I have under observation at present in the children's ward of the City Hospital two boys ten and twelve

years old, the subject of chorea, both with an endocardial murmur and both with tonsillitis, and history of recurrent attacks. Such cases as these should be given the benefit of the doubt, at least, and have the throat thoroughly cleaned out.

In the care of these cases, one indication stands out most prominently, namely, rest in bed; rest not only during the acute febrile stage of the attack, but for a prolonged period. It might be safest to arbitrarily put this period of rest at six weeks, perhaps longer, but certainly no shorter period. At the conclusion of this period massage and passive motion are effectual as a preliminary to moderate exercise on first getting out of bed. The frequency and regularity of the pulse are guides as to the amount of exercise permissible following the bed treatment.

Anemia in these patients is one of the most serious complications to combat, because of its influence on general metabolism as well as upon the heart muscle itself. Tea and coffee, sweets, alcohol and tobacco should be prohibited in chronic heart cases.

The bearing which buccal infections may have on these cases is important to be borne in mind. Serious forms of Rigg's disease are a constant source of danger. The beneficial effect of emetine on this condition is a very great discovery and it should be given a trial.

During the acute febrile stage with the patient entirely recumbent the application of the ice bag is most beneficial. It is usually very well borne, and can be kept on a half hour and off the same. In pericarditis it is beneficial in relieving dyspnea and pain.

A word might be said here against the indiscriminate and routine administration of strychnia in heart and other conditions. Cabot in 5000 observations in thirty-one cases of typhoid fever, four of pneumonia and 150 other cases, was unable to prove that strychnia had any influence on blood pressure in febrile cases. He holds there is no reason for prescribing it as an aid to a failing myocardium. Newburgh(9) also states there is no logical basis for use of strychnia as a cardiovascular stimulant as it does not increase the output from the heart, slow the pulse or raise the blood pressure.

The administration of some of the salicylic preparations to children the subject of joint pains, no matter how vague is to be commended. The occurrence of so-called "growing pains" should always be taken seriously and the child watched for other rheumatic manifestations, and the salicylates given as soon as the diagnosis is clear.

Children respond most readily to digitalis and strophanthus in

moderately small doses. However, the administration of either should be reserved until the first sign of failing or ruptured compensation is noted. Too much cannot be said against the indiscriminate administration of digitalis.

The importance of attention to the diet, digestion and condition of the bowels should be emphasized. A distended abdomen with much gas is a great detriment in endocardial or myocardial trouble.

705 SOUTH THIRD STREET.

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TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of April 8, 1915.

WALTER LESTER CARR, M. D., *in the Chair*.

ANTIMUMPS INOCULATION.

DR. ALFRED F. HESS said that it was well known that an attack of mumps conferred immunity. A person rarely got mumps a second time. This has been the general experience and it had been his in the Hebrew Infant Asylum. During the winter of 1912-13 there had been an epidemic of mumps in this institution in which there were 100 cases of the disease. This winter there had been a smaller epidemic of eighty cases. None of the 100 children who had the disease in 1912-13 had the mumps during the epidemic of the past winter. In trying to find a prophylactic for mumps it was evident since the organism causing mumps had not been isolated that they could have no vaccine or serum, but in view of the fact that immunity was acquired by having the disease it seemed that they might hope to confer immunity by the use of blood from patients convalescing from mumps. In the Hebrew Infant Asylum they had the advantage of knowing the past history of the children with considerable exactness and knew just what diseases the children

had had. They inoculated twenty children whom they were sure had not had mumps before with the blood of convalescent patients, using 6 to 8 cm. of blood from the vein of the elbow of the donor and injecting it intramuscularly. These twenty children were divided into three groups. Four of them were inoculated with blood from patients who had just recovered and in whom there was still some swelling of the parotid. A second group was inoculated with blood from patients about ten days recovered from the disease, while in the third group blood from children who had had the disease several years ago was used. The injections were made when the epidemic had reached considerable proportions. All of the children were then put into the mumps wards and then transferred to other wards in which mumps had developed. Dr. Hess exhibited charts showing the number of cases of mumps in the different wards and the number of inoculated children exposed in these various wards. In all of the wards mumps occurred to a considerable extent after the children were exposed, but not one of the inoculated children contracted the disease. Three children out of the twenty inoculated were put into wards where there were no mumps and of course these had to be excluded from the series. In one ward eleven susceptible children took the disease while no inoculated child did so. The same fact was shown throughout the series. The same result seemed to be shown where the children were inoculated with blood from those who had had the disease several years ago as when the blood of recent convalescents was used.

As a result of the inoculations Dr. Hess said he felt that the epidemic had been limited; they had not had a case now for a month. He was convinced that this was a simple method of preventing the spread of mumps in an institution. Of course, in choosing the convalescent donors they would have to exclude syphilis. The method was also applicable in a family where one child had the disease. As the incubation period of mumps was long, being eighteen days, the injection could be given to other children in the family with every prospect of averting the disease. The length of time during which the immunity lasted had not yet been determined, but it very probably lasted throughout the period of exposure. On the whole he thought it was perhaps better to take the blood from the more recent convalescents rather than from those who had had the disease several years before.

DR. SAMUEL FELDSTEIN of Brooklyn asked Dr. Hess whether he had any records of the inoculated cases as having been in beds adjoining the cases that contracted mumps.

DR. GEORGE DOW SCOTT asked Dr. Hess if the blood of the patients having had mumps some months or years previous was less efficacious than the blood of patients who had recently had the disease.

DR. WALTER LESTER CARR asked whether the children who were inoculated developed any constitutional disturbance or whether any local reaction was observed.

DR. ALFRED F. HESS, in closing the discussion, said there had been no local and no constitutional reaction. If hemolysis between the blood of the patient and that of the donor occurred there might be some reaction. There was no rise of temperature. As to whether the blood from the more recent cases was more efficient than that from older cases it was difficult to say, but he could say that mumps was prevented, and he imagined that blood taken from a case at about the end of the disease gave the highest immunity. The blood taken from cases in which there was still some swelling seemed to work as well as that taken from others.

As to the exposure of the inoculated children—they were put in wards with children with mumps and these children were kept in bed while they had fever, but when that had subsided they were allowed to be up and about the ward and mingled with the other children. He did not see how children could be more exposed, for the other children in the wards played about the beds of those that were confined to bed.

Dr. Hess said he believed the method could be made use of in other infectious diseases as well as mumps where immunity was conferred by one attack of the disease. It would perhaps be applicable in measles but possibly not in so great a degree. It could be used in the family where one child had measles and it was desired to protect other children. It seemed also that at some future time they might learn how to apply it in scarlet fever.

CLINICAL DISTINCTIONS BETWEEN CEREBRAL INTOXICATION, MENINGISM (SEROUS MENINGITIS) AND MENINGITIS

DR. HENRY HEIMAN emphasized the importance of recognizing, if possible, the distinctions between meningitis and conditions simulating it. He defined cerebral intoxication as a condition produced by absorption of toxins derived from bacterial or physico-chemical agents, or from animal or vegetable matter, and characterized by irritative phenomena, such as delirium, restlessness, involuntary muscular movements, etc. It was fairly frequent in severe infections. Pneumonia stood at the head of the list in the matter of cerebral complications. Typhoid fever, influenza, scarlet fever, acid intoxication and other diseases and conditions had a similar tendency to develop secondary meningeal symptoms. The last striking instances of cerebral intoxication might be found in the severe cases of typhoid fever and pneumonia where delirium, photophobia, retraction and rigidity of the neck, twitching of the muscles and even generalized convulsions occurred. In practically all of these cases autopsy revealed no lesions of the cerebrospinal system. According to Osler a real typhoid meningitis occurred in only eleven of the 2000 cases during the Munich epidemic. In pneumonia meningitis was somewhat more common, and was probably the most serious complication. The diagnosis of a true meningitis in pneumonia was difficult, as the lesion was usually on the convexity of the brain and consequently might give no local signs. In the

great majority of pneumonia cases, however, the meningeal symptoms although severe subsided with the advent of the crisis, thus proving that they were merely evidences of profound toxemia.

In distinguishing clinically between cerebral intoxication and meningitis, the following points must be borne in mind. 1. In intoxication there was always an etiological factor to which the meningeal signs were secondary. Occasionally the cause was difficult to find, but thorough investigation would often reveal one of the infectious diseases or other causal factor. 2. The signs in cerebral intoxication were significant of a general cerebral irritation; in primary meningitis there were in addition distinct focal signs. In intoxication one found headache, photophobia, delirium, muscular twitchings, possibly general convulsions; in meningitis there might also be present ptosis of the eyelids, unequal pupils, strabismus, facial palsy, even hemiplegia and other focal manifestations. 3. Lumbar puncture was, of course, the most important and definite means of differentiating the two conditions. In intoxication the fluid was sterile and clear; in meningitis bacteria would in most cases be found in the fluid either by smear or culture and the appearance of the fluid changed from the normal. The cytological examination of the fluid was also significant; in the intoxication cases, no variation from the normal occurred whereas in meningitis various changes were present, depending upon the type of infection, that was, whether it was meningococcal, pneumococcal, influenzal, tuberculous, etc.

When the ordinary clinical and laboratory methods were not sufficient to distinguish between the two above-mentioned conditions, lumbar puncture was not only justifiable, but necessary, even in the presence of acute infection, like pneumonia or typhoid fever. The procedure itself was harmless except in very unusual cases.

Meningism was a term first proposed by Duprè at the Medical Congress at Lyons in 1894 to include all those cases clinically resembling meningitis, but in which lumbar puncture revealed sterile fluid. It had been variously designated by others as pseudo-meningitis, serous meningitis. Its causes might be classified as infectious or toxic, irritative, reflex or hysterical. The term meningism, in the opinion of the speaker, merely meant a greater degree of cerebral toxemia than was found in the condition called cerebral intoxication and differed from it only by showing evidences of increased intracranial pressure and by a symptom complex which still more simulated true meningitis. Among the most important diseases producing meningism might be mentioned autointoxication or acidosis, which was fairly frequent in children and might be mistaken for meningitis, especially on account of the stupor, vomiting, and other meningeal symptoms. Here the differential diagnosis must be made by the frequent observation, and by lumbar puncture if necessary. Meningism might occur in the later stages of gastroenteritis where the symptoms might be so marked as to point to a diagnosis of tuberculous meningitis.

Of the irritative causes of meningism might be mentioned head

injuries, some subacute or chronic ear conditions and operations on the cranium or upon the venous sinuses. Under the reflex causes of meningism helminthiasis might be included as a possible factor. Hysterical meningitis has been mentioned rather extensively by the French, but Aporti believed that these were not hysterical or psychogenic in nature, but rather toxic or infectious in origin.

The points of difference between meningism and meningitis were: (a) The presence of one of the above-mentioned etiological factors in meningism; (b) the transitory character of the symptoms in meningism (the subsidence of the signs when the etiological condition improves); (c) the ophthalmoscopic findings, in meningism one rarely found any ocular changes; (d) the bacteriological and cytological findings in the cerebrospinal fluid in meningitis. This must be regarded as the most important differential sign.

Among other conditions that might simulate meningitis were: 1. Pachymeningitis hemorrhagica interna, which was characterized by rapid enlargement of the head, its distinguishing features being punctate or striate hemorrhages in the retina, and hemorrhagic fluid on puncture of the anterior fontanelle while the spinal fluid remained clear. The etiology of this condition was supposed to be a preexisting hemorrhagic rhinitis of diphtheritic or streptococcic origin. 2. Pachymeningitis interna luetica. 3. Encephalitis, which in infancy and early childhood could only be distinguished from acute meningitis by lumbar puncture.

In closing, the author emphasized the point that he had not attempted to cover the subject of meningitis and analogous diseases, but simply to make distinctions between conditions which were often confused.

DR. L. E. LA FETRA said that it was certain that without lumbar puncture a diagnosis could not be made in very many instances. It was perhaps advisable to resort to lumbar puncture earlier and more frequently than had been brought out in the paper. The significance of the presence or absence of cerebral tache, and of Kernig's and Brudzinski's signs in making a differential diagnosis between true meningitis and conditions simulating it might have been emphasized. If there was any doubt as to the diagnosis one should resort to lumbar puncture to see what the spinal fluid showed. In view of the fatality of true meningitis, in all doubtful cases, even if a tuberculous process is feared, it is advisable to make a lumbar puncture early, for if one finds a turbid fluid there is a good chance that it may be due to the meningococcus or to the influenzal bacillus, for both of which the serum treatment is available. Where the infection is due to the pneumococcus or to streptococcus secondary to a streptococcus infection in some other part of the body the prognosis is hopeless.

In cases of severe malnutrition meningismus may be met with and here the marked retraction of the neck, the great irritability, and the hydrocephalus make the case appear to be one of meningitis. In these cases of malnutrition the fontanelle is frequently deeply sunken, and while this is rarely true in tuberculous menin-

gitis it is of good prognostic significance. As the child improves the fontanelle fills and the retracted neck soon comes to the normal position.

A distinction must also be made in some cases of poliomyelitis with symptoms simulating meningitis and here the spinal-fluid cell count, the globulin content and the way that they change offer a means of making the differential diagnosis.

DR. FENTON B. TURCK did not think that enough emphasis had been placed on the fact that in all young animals and in children the bacteria passed readily into the walls of the intestinal tract; they passed through the submucosa, between and never through the cells, and became destroyed there or in the blood. While they did not form toxins within the lumen of the intestines when passing through the mucosa into the wall, they produced a distinct anaphylaxis. Dr. Turck said he had seen several cases recently that presented the symptoms of meningitis, and it was thought they had this disease, but on microscopical examination and cultures, organisms were found of the *B. coli* type sometimes in symbiosis with cocci in the blood and in the urine. It should be remembered that the peculiarity of anaphylaxis depended on a previous sensitization of the subjects to their own bacteria. In these cases it was the native bacteria, the endogenous and not the exogenous, that were at fault. Three or four cases within six weeks mistakenly diagnosed as meningitis was quite a large number, and the examination showed at once that the invasion was from the intestinal lumen. The use of vaccines in these cases offered great advantages with the administration of the deficient internal secretions, elimination of the infection from the intestines, and the use of alkalies to overcome acidosis. This system of treatment, together with the withdrawal of food, or giving only arrowroot, had been very effective.

DR. MORRIS STARK thought that with regard to these three conditions it was simply a question of degree. Duprè who first discussed meningism discussed it from the standpoint that in this condition there were no lesions but that it was simply the result of irritation of the meninges and he came to the conclusion that there was some actual change in the spinal fluid, a chemical change, or a change in the leucocytes. In the very fulminating cases in which one found no germs the reason for not finding an organism was that the patient died before pus formation had had time to take place.

One should also take into consideration the question of reaction to irritation. There were different groups of children; there were the spasmophiliacs who were sensitive to a marked degree to any meningeal irritation and then there was a group of children who did not respond so easily to irritation.

In the cases due to intoxication from the intestinal tract the results were probably produced by bacteria in the spinal fluid but the changes were so unimportant that they were not detected. Retraction of the neck was a very common symptom in all manner of sickness in babies, and in making a diagnosis of meningitis it be-

came a question of the degree of retraction and the force that it required to bring the head forward.

DR. PORTER.—One point suggested itself in connection with the babies suffering from malnutrition who lay with their heads back. This condition might be due to the concentration of salts in the muscles produced by the rapid loss of fluid from the body.

The last speaker said that the conditions of cerebral intoxication, meningismus and meningitis were manifestations of symptoms different in degree but due to the same set of causes. In this connection it might be suggested that the invading organisms passed into the meningeal spaces and that breaking up there they gave rise to a definite protein intoxication.

DR. ROYAL STORRS HAYNES said in regard to serous meningitis complicating indigestion that he would like to call attention to a type of case in which the fontanelle was not retracted, as Dr. La Fetra had correctly indicated to be the rule, but, on the contrary, the exudate caused a distinct distention and the fontanelle was hard and without pulsation. He had seen such a case with Dr. La Fetra in which the child had been ill with gastrointestinal intoxication and showed the symptoms of meningitis. The fontanelle was full, hard, and there was no pulsation. While deciding on the advisability of a lumbar puncture the child began to improve and pulsation returned to the fontanelle. It was interesting to correlate this case with a full fontanelle and symptoms indicative of meningitis with those cases in which the fontanelle was sunken.

THE SURGICAL TREATMENT OF DISEASE OF THE STOMACH IN CHILDREN.

DR. ANGELO L. SORESI said the conditions for which surgery of the stomach in children were required were: wounds; foreign bodies; stenosis of the esophagus near the cardiac end, and stenosis of the pylorus. Surgery of the stomach in children resulted in many failures, the main reason of which was that the attending physician referred the patient to the surgeon when already in a hopeless condition. Surgery should always be a last resort, but the attending physician should keep in mind that the condition might be one requiring surgical intervention and refer the patient to the surgeon in time.

In the case of wounds the diagnosis was easy, but as it was difficult to determine the degree of injury inflicted, intervention should be immediate when the child was brought to the surgeon immediately after the injury; if he was brought later expectant treatment was better because many wounds of the stomach in children healed spontaneously. Expectant treatment was imperative if the child was seen many hours after the accident and no complications were present. Dr. Soresi relates the case of a child who was stabbed with a penknife by a playmate, the injury not being discovered until thirty-six hours later; no sign of distress was present; the child was never operated on and was in perfectly good health eighteen months after. In experimental work wounds of the stomach in which the

stomach was cut clean through with scissors for about the length of a centimeter, the mortality of absolute nonintervention was about 30 per cent.; the mortality of intervention after twenty-four hours was 80 per cent.; the mortality after one to three hours was zero.

Foreign bodies did not often cause serious trouble in the stomach because when they passed into the stomach they generally passed into the intestine and were expelled. However, they might locate themselves in the lower part of the esophagus and require removal through the stomach. Medical treatment was absolutely powerless if the foreign body caused serious stomach trouble, such as hemorrhage, perforation or occlusion. The difficulty in these cases lay in the fact that nobody thought of the presence of a foreign body which could be very easily seen through the fluroscope or with the x-ray picture.

Stenosis of the esophagus near the cardia was caused by the passage of caustics or might be congenital. In this condition, if the passage of sounds through the mouth could not be effected the diagnosis was clear and the indications for surgical intervention were not doubtful.

Stenosis of the pylorus was a condition peculiar to very young children and, in the opinion of the speaker, was more common than was generally supposed. It might occur immediately after birth, sometimes after a few days, and sometimes when the children were several months old. Generally it came on suddenly in well-nourished children born of healthy parents. At times the symptoms in the beginning were slight, while again vomiting, not very abundant, but very swift, came on, consisting of milk, saliva and mucus, seldom bile and still more rarely blood. Later the vomiting became more frequent, and one could note the peristaltic movement of the abdomen. Still later urine and feces became scanty, and the child lost weight and felt cold. The loss of weight was very remarkable and rapid at the beginning then became slow and progressive. The appearance of a tumor on the pylorus was not an absolutely reliable sign of stenosis of that organ. Stenosis of the pylorus could only be mistaken for spasm of the pylorus and some kind of intestinal obstruction. By referring to the anatomy of the stomach one could not fail to make a diagnosis. Medical treatment would overcome spasm of the stomach. If obstruction was suspected the x-ray would enable the physician to make a positive diagnosis. If no bismuth passed through the pylorus after three hours one could feel sure that he was dealing with a true stenosis of the pylorus. The question whether one was dealing with a real spasm of the pylorus or with a growth of the pylorus was exceedingly difficult to answer. The spasm might cause a hypertrophy of the muscular coat so that the spasm would be the real cause of the increase in the muscle. It would seem that the condition was not congenital but acquired, and that it could not be remedied by medical means although these should always be exhausted before resorting to surgery.

Children stood operations very poorly, and the younger the child the more serious was surgical intervention. Anesthesia was of the greatest importance in surgery in children; only the most expert anesthetists should administer anesthesia to children. Speed and thoroughness were absolutely essential to good results.

Gastroenterostomy was the operation of choice up to the present time, but, of course, it was not a physiological operation. Dr. Soresi said he had devised an operation to conserve the physiological relations of the stomach and duodenum. A piece of ileum about 3 cm. in length was severed from the rest of the intestine. With a seroserous suture close to the attachment of the mesentery on the side that naturally came in contact with the pylorus without twisting the pedicle, it was secured over the pylorus, half on the stomach and the other half on the duodenum; it was then cut longitudinally about 2 cm. from the suture line, so that it became a large square piece, opening itself and showing the mucosa. The stomach and duodenum were also cut longitudinally, parallel with the seroserous suture line, leaving a margin of about 2 mm. as was done for the intestine. This incision was started from the duodenum and must be about 6 or 8 mm. longer than the length of the seroserous suture, extending, therefore, 3 or 4 mm. on the stomach and the duodenum. A through and through suture with catgut No. 0 was started alongside of the seroserous suture and continued all around, until the opening made in the stomach and the duodenum was closed. This suture done rapidly would check all the bleeding. The seroserous suture was then continued all around and the procedure was completed. It was evident that between the stomach and the duodenum there was now a large passage, lined with perfect mucosa, so that possible contractions would not affect the easy passage of the contents of the stomach into the duodenum.

Several animals which had been operated on by this method and demonstrated its advantages were exhibited. They were in perfect condition one year after the operation; in fact in much better condition than dogs operated on at the same time with gastroenterostomy, with occlusion of the pylorus or leaving the pylorus patent.

One of the essential points in surgery of the stomach in children, and for that matter in adults, was that the surgeon should never put his hands into the abdomen and should use as little retraction as possible; because the hand of the surgeon could not be sterilized, and from his research he was sure that adhesions were caused by trauma and infection. The laparotomy incision should be made about $\frac{1}{2}$ cm. from the linea alba between the xiphoid and the umbilicus for at least 5 cm. The rectus muscle was divided by blunt dissection.

Foreign bodies were extracted through gastrotomy, and if located in the lower esophagus might give great difficulty; here a cystoscope might be very useful in illuminating the field.

In stenosis of the pylorus the surgeon had to make a good permanent passage between the stomach and the duodenum. The

operation resorted to in these conditions was Loretta's, which consisted in stretching the pylorus with the finger. Gastroenterostomy by Dr. Soresi's method was preferable to Loretta's operation, to jejunosomy and to the different kinds of pyloroplasty. The gastroenterostomy should be a posterior one if possible. The use of clamps should be avoided.

Dr. Soresi showed lantern slides demonstrating the technic which he recommended.

DR. JAMES T. GWATHMEY said the general principle had been accepted that chloroform was not an appropriate terminal anesthetic in children under nine years of age unless accompanied by oxygen, but one could initiate the anesthesia with chloroform and then continue with other anesthetics in such a way that the anesthesia was practically devoid of danger. The American statistics of about one-half a million cases showed that it was very satisfactory to begin with essence of orange, then follow this with chloroform for the second stage and then change to warm ether vapor. By using this sequence, the patients could be brought out of the anesthesia without struggling or vomiting, but if the anesthesia was initiated with ether there would probably be both. With gas and oxygen the anesthesia could be continued with children of any age.

The element of *time* must be taken into consideration, especially with children, and while the surgeon must do his work carefully and without hurry, he should not lose sight of the fact that a child should not be kept under the anesthetic any longer than necessary. As a general rule it might be stated that children should not be kept under an anesthetic longer than one hour.

DR. LEON T. LE WALD agreed with reference to the question of diagnosis, that repeated examinations with the Röntgen ray offered the safest and surest way of determining between spasm and true stenosis of the pylorus. There were several ways of making this distinction, but in his opinion, if nothing was passing through the pylorus in from one to three hours after the administration of the bismuth meal this was an absolute indication for surgical interference.

Dr. Le Wald said he had seen gastroenterostomies that were successful in children and the children were well nourished afterward. In one case which he had followed for two years the function was perfect and the child was well nourished.

DR. WILLIAM H. STEWART was interested in Dr. Soresi's remarks on foreign bodies. It was well known that many foreign bodies passed safely through the digestive tract; even open safety-pins had been known to pass through without giving any trouble. The only indications for interference was when the body swallowed occasioned clinical symptoms.

In regard to the differential diagnosis between pylorospasm and true stenosis, the x-ray was undoubtedly a great help but he questioned whether if no bismuth was found passing through the pylorus after three hours that that was sufficient evidence that one was dealing with a true stenosis. Such an x-ray finding would

at least have to be verified by a number of examinations. In some cases in which nothing passed the pylorus for three and one-half hours after the administration of the bismuth, a reëxamination, after the administration of antispasmodics, showed the bismuth passing through the pylorus.

It is of particular interest that an organic stenosis may result from pylorospasm. The small but constant irritation of the spasm over a considerable period of time produces a hypertrophy of the muscular structure, and eventually stenosis.

Dr. Stewart said he would like to ask Dr. Soresi if he had made any observations on the stomachs of dogs after gastroenterostomy with reference to the emptying of the stomach.

In what proportion did the bismuth meal pass through the patent pylorus and what proportion through the gastroenterostomy opening? It had been asserted that 95 per cent. of the food ingested passed through the pylorus while only 5 per cent. passed through the gastroenterostomy opening. This had not been his experience; he thought that about 50 per cent. passed through the pylorus and about the same amount through the stroma.

It had been interesting to hear what the speaker said in reference to the susceptibility of bone to infection. Some men were now saying that the death knell of Lane's plates had been sounded. He had watched Dr. Lane do this operation and the vital point in his technic was that at no time did the operator's hands come into contact with the bone.

DR. FENTON B. TURCK said Cailli reported (in *Rivista Ospedaliera*) the case of a child having spasm of the intestine with obstipation which had lasted for three weeks. There was continual vomiting and all symptoms of mechanical obstruction. An exploratory operation showed that the condition was purely spasmodic, so the wound was closed and a systematic course of treatment was carried out, under which the child recovered. Some had ventured to state that a purely spasmodic condition would not last as long as three weeks, but Dr. Turck had observed the condition to persist for a long time in spasmophilic children, and it represented a type of fatigue, a delayed period of relaxation following contraction which continued for a long time and is often mistaken for true stenosis. It was possible for bacteria to pass from the mother to the fetus and to lodge in the muscle fibers in the pylorus and set up irritation which might result in a congenital mechanical obstruction, due to hypertrophy of the muscles and a stenosing pylorus. But one should be very careful in making a diagnosis of real obstruction, which rarely exists. The treatment by administration of deficient internal secretions, elimination of infection from the intestinal tract and treatment directed to the recovery of fatigue of the muscle wall of the stomach and intestines give the best results.

DR. SORESI in closing the discussion insisted on repeated x-ray examination, and stated again that in order to be certain that one has to deal with a real stenosis of the pylorus and not with a

spasm, the examination with the x-ray should be repeated several times, and that surgical intervention should not be resorted to until all medical means have been exhausted.

As to what happens in regard to the emptying of the stomach after gastroenterostomy in animals if the pylorus is patent, it can be seen with the x-ray that a great amount passes through the gastroenterostomy opening, which might be due to the fact that in the passage of the food from the stomach through the pylorus it has also to pass in descending to the intestine over the gastroenterostomy opening, and this coefficient may have led observers to think that the greatest amount of food passes through the gastroenterostomy opening. In animals it is seen that if the pylorus is patent the dog is in perfect shape, eats and acts absolutely as if he had never been operated on, but, if the pylorus is excluded the dog gets thin no matter what kind of food and how much of it is given to make it fat. This may be explained by the fact that the digestion in the stomach of the dog is exceedingly slow, and when the pylorus is excluded and the gastroenterostomy opening is made for the passage of the food from the stomach to the intestine the food passes very rapidly and digestion is not complete. In human beings this does not occur because the digestion of the stomach is not so slow as in animals, not if the food or part of it remains in the stomach a certain time after, even if it has to pass through the gastroenterostomy opening.

The hands should never be put into the abdominal cavity in performing any operation on the abdominal organs because this bad practice causes trauma and leaves disagreeable adhesions. Dr. Soresi exhibited a number of specimens showing the results obtained by the reconstruction of the pylorus, and the effect of the presence of unabsorbable material in the stomach and intestine in which it was shown that when there was unabsorbable material present the scar tissue was much thicker than when such material was absent, and he showed a number which had been operated on, the pylorus of which had been reconstructed by the method explained in his lecture when the animals were in perfect condition, in this way demonstrating the points brought out in his paper.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Early Development of Myositis Ossificans.—F. P. Weber and A. Compton (*Brit. Jour. Child. Dis.*, 1914, xi, 497) report a striking example of the commencement of myositis ossificans progressiva in a baby, the first signs of the disease having been almost, if not quite, congenital. The early diagnosis was due to the appearance of diffuse, hard, painless, transient lumps or swellings at various parts of the patient's body. The diagnosis of myositis ossificans progressiva was strongly confirmed by the presence of microdactyly of the great

toes and the thumbs. A bony spicule on the right side of the neck (possibly connected with the outer border of the clavicular origin of the sternocleidomastoid muscle), was already present when the child first came under observation at seven and a half months. The effect of traumatism as an occasional exciting cause of the local manifestations of the disease is illustrated in the present case by the occurrence of the first "lump" (*i.e.*, a swelling on the left side of the neck) a few days after a slight fall on the left shoulder, and by the development of bony lumps at the site of an incision and at the site of fibrolysin injections. The disease appears in this case, as in other cases, to be due to a congenital, but not inherited, tendency to the formation of fibrous tissue and bone in striped muscles (that is to say, in the connective tissue normally belonging to the muscles), especially at the site of, and as a result of, traumata (even slight traumata) of various kinds. The present case also shows that the growth of the newly formed bone in myositis ossificans progressiva does not necessarily proceed from the periosteum, as it seems to do in cases of ordinary traumatic localized myositis ossificans ("rider's bone," etc.). A bony lump at the site of an incision into the vastus externus muscle of the right thigh developed quite far from any periosteum. The disease, which advances by repeated fits and starts, appears histologically to be an ossifying hyperplasia of the fasciæ and connective tissue of the striped muscles, especially the muscles of the trunk. In the early stages of the disease, however, the muscular swellings constituting the exacerbations sometimes subside without the immediate occurrence of any local ossification at the site of the swellings.

Nervous Cretinism.—In 1908, R. McCarrison (*Brit. Jour. Child. Dis.*, 1914, xi, 508) drew attention to the frequent association of a definite train of nervous symptoms with cretinism. These symptoms were present in seventy-one cases among a total of 203 cretins, and appeared to constitute a definite type of the disease to which he applied the term "nervous cretinism." The symptoms of this type of cretinism are, in brief, a combination of congenital myxedema (cretinism) with congenital cerebral diplegia, in all their varying grades. In one case the myxedematous signs may predominate, in another the diplegic. The dolichocephalous skull and the facial appearances may afford important indications of the nature of the case, since myxedematous signs are often to be observed in the face and head when they are absent from other parts of the body. Where the nervous symptoms are predominant, there is often a lesser degree of stunting of growth than is the rule in the purely myxedematous type of the disease. The signs of derangement of the central nervous system may vary from the slightest degrees of paraplegia to the most intense grades of spasticity, athetosis, fits, and idiocy. Nystagmus, which is rare in the purely myxedematous forms, may be present in these cases, and squint is common. Such extreme examples of this type of cretinism may be indistinguishable from cases of "cerebral diplegia," and it is only by the recognition of the scanty myxedematous signs of the malady, and by the application of the therapeutic

test of thyroid medication, that their true nature can be appreciated. Sufferers from the lesser degrees of the affection are backward in their physical and mental development, slightly cretinoid in appearance, slow to cut their teeth, to talk or to walk, paraplegic, afflicted with stubborn constipation, or it may be with enuresis. Edmunds has shown that the changes in the central nervous system which result in animals as a consequence of thyroidectomy consist in "chromatolysis of the cells, large and small, swellings of the cell bodies, swelling of the nuclei, extension of the nucleus, and total destruction of the cell body, leaving only a practically free nucleus." These changes, which cannot be attributed to microbic or protozoal agencies, are, McCarrison believes, sufficient to account for the symptoms seen in "nervous" cretinism. These being the effects of athyroidism on the central nervous system, cases of congenital thyroid defect should be recognized, and treatment undertaken, at the earliest possible moment before permanent damage has been done to the neurones. The amount of benefit to be derived from thyroid medication will be dependent on the duration of the hypothyroidism, or of the athyroidism prior to the commencement of treatment. Since defective thyroid function in the mother is the essential factor in the production of cretinism in the child, it becomes necessary to protect the child during the period of gestation from all influence which may throw an added strain on her thyroid mechanism. Of special importance in this connection are the effects of infectious diseases, of helminthiasis, of intestinal toxemia, and of fright and mental strain. All these should be rigidly guarded against. In the care of infants who may be the subjects of congenital hypothyroidism, the questions of their food and of their freedom from intestinal disorders are of great importance. We must take the greatest care in the artificial feeding of infants to provide their milk in a form which is not defective in vitamins. Boiling cow's milk destroys many of its most important constituents. If eggs of intestinal parasites are found anthelmintic treatment should be combined with the thyroid medication. An important influence is exercised on the thyroparathyroid mechanism by certain intestinal anaerobes. The administration of the *Bacillus lacticus bulgaricus* or of potent intestinal antiseptics, and colon irrigations with antiseptic fluids, such as 1 per cent. ichthyol solution may be used.

Action of Inorganic and Organic Phosphorus Preparations in the Treatment of Rickets.—Ernst Schloss (*Arch. f. Kinderheil.*, Bd. lxiii, Heft v-vi, 1914) says that there is some question of the importance of the addition of cod-liver oil to the calcium phosphate preparations in the treatment of acute and chronic rickets. Whether the cod-liver oil is necessary to the improvement in metabolism which puts an end to the changes in the bones is an open question. For this reason he has made a careful study of two cases of rickets, which he reports here. He also has studied the value of nutrition in this disease. For nourishment he used in these cases mother's milk. For the administration of lime he used the tricalcium phosphate. His first case was that of a child which developed rickets at a very early age,

having a marked craniotabes at the age of three months. There was no less than the normal amount of mineral matter in the food on which the child was fed, but the organs were unable to assimilate it. There was small retention of nitrogen by the system in relation to the dysplasia and loss of weight of the child. The proportion of the nitrogen exchange to the exchanges of calcium and phosphorus was very small. The author believes that there is an undoubted influence to be observed of the tricalcium phosphate on the mineral exchanges of the body. This action was observed not only when phosphates were combined with cod-liver oil, but apart from it. The second case studied had suffered from a severe alimentary intoxication before his rickets occurred. The effect of tricalcium phosphate and tricalcol on the balance of the bone-building materials was marked and excellent. With mother's milk as a food he believes that the use of cod-liver oil is not necessary to get good results. The natural nourishment combined with the tricalcium phosphate causes improvement in the retention of minerals. In treating this disease we should take care to supply nutrition for the soft tissues as well as bone-forming material. He found that the inorganic salts combined with mother's milk had a better effect than the organic salts combined with cow's milk and cod-liver oil. Behind these two medicinal factors there is a power of appropriation of the organs for minerals; the kind of nourishment with the proportions of food and medicines given is assisted by the kind of mineral salts used.

Study of the Parathyroids.—L. Thinn (*Arch. f. Kinderheil.*, Bd. lxi, Heft v-vi, 1914) has made an exhaustive study of the anatomical and histological structure of the parathyroids in man, in the fetus, and in animals of various kinds. He finds that there are never more than two pairs of parathyroids, an upper and a lower pair. He examined the fresh organs of 100 human beings from two to twenty years of age. He also had made sections of five fetal cases between six and seven months of pregnancy, and of many rats, cats, dogs, and guinea-pigs. In a fetus of three and a half months he found the position to be on the posterior border of the thyroid, in the angle between the esophagus and the trachea. They occurred as reddish, round bodies of symmetrical shape. The lower is larger than the upper but of the same type. Distad it passes into a sort of strand of tissue of a sickle shape. The lower body is connected with the thymus. In the fetus of five weeks he found the parathyroids present. Microscopically the picture is not always the same. There are large masses of epithelial cells; surrounded by a capillary network and supplied with vessels. In adults there are fat cells, sometimes in masses. Two kinds of large cells are present in the parathyroids, the so-called "Haupt" cells and the oxyphile cells. The "Haupt" cells are round, with a marked nucleus, and a clear protoplasm that does not stain. The typical cells are polygonal and are arranged in a sort of pavement of flattened cells. The cell border and nucleus are well marked. The same cells are found in the fetus and in young children. The oxyphile cells are larger than the "Haupt" cells, polygonal and stain with eosin. The nucleus also

stains, and is darker and somewhat smaller than that of the "Haupt" cell. They are at the height of their development at twenty years of age, and occur alone and in small groups. There are also seen between the cells clear round droplets of a reddish fluid free in the connective-tissue network. The cells form a sort of lumen in which these drops occur. Up to two years of age none of these droplets of supposed secretion are found; they are largest in adults. They may be of colloid nature. This secretory product in the acini is not a typical secretory material. The blood-vessels form a network with polygonal masses, having a large vessel in the center, and smaller ones radiating from it. The artery of one of these masses runs into a network of capillaries.

Precocious Maturity in Girls.—F. Beekman (*Arch. Pediat.*, 1915, xxxii, 4) records a case of precocious maturity in a girl six and a half years of age. Nothing abnormal was noticed until she was about four years of age, when she commenced to have peculiar laughing spells, which at times lasted as long as an hour. Soon after this it was noticed that her breasts were becoming prominent and she commenced to bleed from her vagina periodically. Her mental development was about that of girls of her age, though her bodily development was that of a young woman of sixteen. Radiograms of the elbow-joint showed ossification resembling a development of at least sixteen or seventeen years of age. Reviewing the literature, Beekman says that the symptoms of precocious maturity in the female are the early onset of the changes due to puberty. The changes manifested are both anatomical and functional, but the mental development does not keep pace with the somatic. Abnormal development in children associated with tumors ("hypernephromas") springing from the cortex of the adrenal gland cannot be considered as true cases of precocious maturity. Precocious maturity is due to conditions affecting the internal secretion of certain of the ductless glands. It is probably caused by the premature activity of the interstitial cells of the ovaries, which activity is produced either by some intrinsic factor or by the effect of a hormone from the hypophysis cerebri, pineal gland or possibly thyroid.

Syphilis in Children.—W. C. Hallopeter (*Penn. Med. Jour.*, 1915, xviii, 275) says that hereditary syphilis is very frequently entirely unrecognized in young children, since they are frequently suffering from some catarrhal or febrile complication that often misleads us. We have all come to regard "snuffles," however inelegant the term may seem, occurring in a child under three months, as the most constant symptom of inherited syphilis. This type of coryza was undoubtedly present in three-fourths of his cases, but it is a matter of extreme difficulty to make a discriminating diagnosis between simple or influenzal coryza and adenoidal and syphilitic snuffling in a baby a few weeks old. The most formidable type of hereditary syphilis may not show up, clinically, in children, until after the fourth or sixth week. Pseudoparalysis is an early and often overlooked symptom occurring between the second and fourth weeks. Cranio-

tabes belongs as frequently to syphilis as to rickets. The Hutchinson teeth may occur in the temporary set.

Salvarsan in the Therapeutics of Childhood.—T. Le Boutillier (*Penn. Med. Jour.*, 1915, xviii, 273) states that the best results occur when salvarsan is used at the earliest possible moment; that it should never be given unless one or more positive Wassermann reactions have been obtained; that the most rapid effect is produced when given intravenously, the doses being repeated at intervals until negative Wassermann reactions occur; and that the combining the salvarsan with mercurial treatments between doses is more efficacious than the use of salvarsan alone.

Intussusception.—W. R. Cubbins (*Surg., Gyn. and Obst.*, 1915, xx, 177) says that in cases of intussusception the anatomical condition that has attracted his attention the most is the length of the mesentery of the terminal ileum and the fact that the descending colon in these cases also possesses a distinct mesentery. In early cases there is a tendency for the intussusception to recur and, in order to avoid this accident, he uses the following method: The ileum is brought parallel to the ascending colon and sutured to it with three to five catgut sutures. The cecum is fixed in the iliac fossa in some cases with another suture. The two bowels are then parallel and cannot intussuscept. The long mesentery of these bowels allows them to assume a horizontal position in the belly, and we therefore need not consider a kinking of the ileum.

Occurrence of *Bacterium Welchii* in the Dejecta of Children.—During the past few years numerous observers have ascribed an etiological significance to the abnormal development of *B. aërogenes capsulatus* in the intestinal tract in a variety of pathological conditions. In eighteen children suffering from minor ailments but without marked derangement of the intestinal tract *B. aërogenes capsulatus* was isolated by J. H. M. Knox and W. W. Ford (*Johns Hopk. Hosp. Bull.*, 1915, xxvi, 27) on the first examination in nine cases. In nine other cases the organism was not obtained on the first trial, but subsequent examination revealed it in all instances. It is evident from the results of this inquiry that *B. aërogenes capsulatus* must be regarded as a normal and constant inhabitant of the intestinal tract in children except in breast-fed infants. The attaching of any pathological significance to the presence of this species in the intestine can, therefore, properly be made only when evidence can also be adduced to show its excessive development.

Bone Transplantation for the Cure of Tuberculous Spinal Disease.—C. M. Jacobs (*Jour. A. M. A.*, 1915, lxiv, 400) says that surgical measures for tuberculous spine disease are a great advance over conservative treatment, but should be restricted to selected cases. Undoubtedly they shorten the period of disability. Not only may existing deformity be prevented from becoming exaggerated, but also deformity itself may be prevented by surgical measures. Too early reliance cannot be placed on the strength of the bone graft. It takes time for the splint to become securely fixed by permanent callus. External support must not be disregarded for many months following

the operation; otherwise deformity may ultimately occur. Even with postoperative protective treatment for a period of six or more months, the duration of treatment is much shorter than the average duration under nonoperative methods.

Institutional Mortality of the New-born.—L. E. Holt and E. C. Babbitt (*Jour. A. M. A.*, 1915, lxiv, 287) have analyzed the records of 10,000 consecutive confinements in the Sloane Hospital for Women. The deaths in the hospital during the first fourteen days were 3 per cent. of the living births. For half this number prematurity was responsible. Forty-eight per cent. of the total deaths and 66 per cent. of those due to prematurity occurred on the first day. Congenital weakness and atelectasis together made up 58 per cent. of the total deaths. The mortality from conditions intimately connected with delivery—accidents of labor, hemorrhage, sepsis and asphyxia—together made up but 20 per cent. of the deaths of the first fourteen days. Malformations and congenital diseases other than syphilis caused 4 per cent., and syphilis 4 per cent. The only important disease developing after birth was pneumonia. Stillbirths must be reckoned as one of the large problems in infant mortality; they are one and a half times as many as the deaths from all causes during the first two weeks. Except for the larger rôle played by syphilis, the causes of stillbirth in no way differ from those which produce death during the first days of life. When we come to consider to what degree preventive measures might influence the mortality of the first two weeks of life, two things stand out prominently: The great number of deaths from congenital weakness can be reduced only by care of the mother during her pregnancy; the number of stillbirths and the deaths from causes connected with parturition can be largely reduced by good obstetrics.

Operative Treatment for Selected Cases of Cerebral Spastic Paralysis.—W. Sharpe and B. P. Farrell (*Jour. A. M. A.*, 1915, lxiv, 482) do not believe that all cases of spastic paralysis should have a cranial decompression; in some mild cases tendon lengthenings alone are sufficient, and this is especially true in the absence of mental impairment. But those selected cases of spastic paralysis, particularly of the hemiplegic and paraplegic types, which show signs of increased intracranial pressure by an ophthalmoscopic examination, can be very much improved by such a procedure. The writers report their operative procedure in sixty-five cases selected from 201 as suitable. The cases of agenesis and maldevelopment of the cortex, of course, *cannot* and *do not* show signs of increased intracranial pressure, and are therefore easily excluded by an ophthalmoscopic examination; besides, the cases of lack of development of the cortex and pyramidal tracts are frequently premature babies, being born the seventh or eighth month, so that a careful history is very important. A large right subtemporal decompression is performed to relieve the intracranial pressure. If the intracranial pressure is extremely high and remains high after the operation, a left subtemporal decompression is performed the following week, the operative recovery requiring only a week or ten days. The operation consists of a

vertical incision over the side of the head from $2\frac{1}{2}$ to 3 inches in length extending from the parietal crest down to a point overlying the zygomatic arch and just anterior to the external auditory meatus; that is, to the lowermost point of the cranial cavity. The fibers of the temporal muscle are separated longitudinally and then a small opening in the squamous bone, made by the Doyen perforator and burr, is enlarged by rongeurs to a diameter of from 2 to 3 inches. The dura is now incised in a stellate manner, allowing the brain to expand, and in this way the increased intracranial pressure is relieved. The dura is *not* resutured and the bone is not replaced. The after-treatment consists in the correction of deformities by tendon lengthenings if necessary, or merely stretchings of the contracted muscles, the maintenance of corrected positions through the employment of especially adapted braces, skilled massage and faradism, particular attention being given to the weakened and overstretched muscle groups. A careful, systematic course in muscle training is carried on daily. This procedure is by no means a cure, and possibly the improvement is only temporary; but it is reported because of the pathology of these selected cases in which operation has been performed and the general continuous improvement which has resulted and is still progressing.

The Pylorus after Gastroenterostomy for Congenital Pyloric Stenosis.—D. Lewis and C. G. Grulee (*Jour. A. M. A.*, 1915, lxiv, 410) report the autopsy findings of a case 256 days after operation, because it, with others which have come to necropsy some months after operation shows that a congenital pyloric stenosis associated with a hypertrophy of the musculature and connective tissue about the pylorus is permanent, and is not relieved after a gastroenterostomy which functionates perfectly. As the stenosis is permanent and not relieved when the pylorus is put in a condition of at least partial rest by a gastroenterostomy, it would seem that attempts to relieve this stenosis by gastric lavage and medical treatment were futile. The diagnosis once established, the indication for treatment, which is surgical, is established. The high mortality associated with the early cases was due to the poor condition of the children when operated on. Posterior no-loop gastroenterostomy is the most satisfactory operation; although excision of a wedge of the hypertrophied muscle down to the mucous coat, permitting of expansion of the mucous membrane, seems to give good immediate and late results. Gastroenterostomy is well stood by infants, if performed rapidly and without much trauma.

C. L. Scudder (*Bost. Med. and Surg. Jour.*, 1915, clxxii, 166) quotes three authentic cases in which the pylorus tumor discovered at operation has been seen from three to nine months following a plastic operation, and well-authenticated reports of an x-ray bismuth examination in twenty-six cases of proved congenital stenosis of the pylorus following posterior gastroenterostomy. All of these cases were observed by skilled physicians, surgeons and roentgenologists. The returns from these twenty-six cases are uniform. In each case the pylorus was obstructed, in each case the stoma was patent and

was the only exit for the bismuth meal from the stomach. From this evidence it is fair to conclude that the tumor seen at operation continues to obstruct the pylorus. The tumor alone with the mucous membrane changes is an adequate cause of the obstruction in all its phases, and it is unnecessary to imagine a pyloric spasm associated with the obstructing tumor. The surgical treatment of these cases is without any question the only permanently effective treatment. The postponement of the operation with the idea, now so prevalent, that the hypothetical spasm will let up and the tumor disappear and the child recover is unjustifiable. A baby having tumor obstruction will always have tumor obstruction. The omission of the hypothetical pyloric spasm from any consideration in these cases will result in earlier adequate surgical relief.

Chronic Lymphatic Leukemia Treated with Benzol.—H. D. Rolleston and J. D. Rolleston (*Brit. Jour. Child. Dis.*, 1915, xii, 33) record a case of lymphatic leukemia in a boy six and a half years old. The total leukocyte count was 60,000. On December 29, benzol treatment was commenced with an initial dose of \mathfrak{Mvi} *per diem*. On January 10 it was increased to \mathfrak{Mxii} *per diem*, and on January 25 to \mathfrak{Mxiv} . This dose was continued until February 12, when the benzol was stopped altogether. Progressive diminution in the total leukocyte count occurred during the treatment. The patient's general condition appeared to be greatly improved. The spleen remained practically unchanged in size, the glandular enlargement did not become less, and the patient did not put on weight satisfactorily. After the benzol was omitted from the treatment the leukocyte count was still taken weekly and at one time was as low as 2900. About a week after the benzol had been stopped, a purpuric rash appeared on the forehead. On April 2 he was readmitted to hospital. The lymphatic glands were found to be distinctly harder and a trifle larger. The patient's general condition was decidedly worse. The total leukocyte count was 123,000, the small lymphocytes being the predominant cells present. Benzol \mathfrak{Mix} *per diem* was again given, and in ten days' time the count had fallen to 15,000. This marked decrease was also accompanied by an improvement in his general condition. On April 16, the benzol was again omitted, and on April 20, the leukocyte was found to be 20,000, and on April 30, 29,400. On May 11, a culture from the throat showed the presence of numerous diphtheria bacilli. The condition of the face suggested cancrum oris, and, though the stomatitis improved considerably under the local application of salvarsan, the child passed into a septicemic state and died on May 20. Blood examination showed a well-marked leukopenia—1400 leukocytes on May 14 and 1600 on May 15.

Emulsions of Liquid Paraffin and Castor Oil in Treatment of Certain Types of Chronic Dyspepsia in Childhood.—C. McNeil (*Edinb. Med. Jour.*, 1915, n. s. xiv, 100) says that emulsions of liquid paraffin or of castor oil (in small nonpurgative doses) are of great value in the treatment of various and apparently distinct types of chronic dyspepsia in childhood. The types dealt with are: (a)

Malnutrition, frequently associated with chronic diarrhea, and only seldom with constipation; (b) enuresis, with dyspeptic symptoms; (c) recurrent vomiting (cyclical or bilious vomiting); (d) recurrent attacks of fainting, or sudden pallor; (e) urticaria or eczema, with dyspeptic symptoms. In a great majority of these diverse types of illness there is an abnormal condition of the stools: this may often be a true diarrhea, but not seldom also merely a too soft consistence of the stool with or without the presence of mucus. In the series constipation was present in only a small majority. A large number of these cases have followed the common infectious fevers of childhood, especially measles and whooping-cough. These postinfection cases of dyspepsia seem particularly amenable to this form of treatment. In a series of thirteen completed cases of enuresis, eight were cured and three greatly benefited by this treatment. The action of emulsions of liquid paraffin, ℞xxx, and castor-oil, ℞xv, t.i.d. is similar. It is entirely local, and confined to the mucous membranes of the alimentary tract. The action is most probably a sedative one, exerted on the congested and unhealthy mucous lining of the small and large intestines. Cod-liver oil is a direct nutrient. Liquid paraffin has no nutritive value, and can only subserve nutrition by its ameliorative action on the digestive surfaces of the bowel. If the digestion is at fault, the use of cod-liver oil, instead of promoting nutrition, may actually retard it, by depressing the activity of secretion in the stomach; while petroleum emulsion will often quickly improve the efficiency of digestion. Where malnutrition is therefore associated with chronic dyspepsia, liquid paraffin may be employed from the outset; while cod-liver oil should, as a rule, be reserved to a later period when the dyspepsia has been overcome or improved.

Serum Therapy of Epidemic Cerebrospinal Meningitis in Childhood.—A. C. Helmick (*Ohio State Med. Jour.*, 1915, xi, 17) says that unless there are disturbing evidences of pressure, children over two years should receive 30 c.c. of serum, and babies 15 c.c., as a minimum dose, regardless of the amount of fluid withdrawn. Thirty cubic centimeters is the standard dose in mild cases, and in the chronic form where the organism is present. In the more severe form, and in fulminating cases, one should give serum sufficient in amount to give evidence of intradural pressure, and a sensation of abnormal resistance. In all except the fulminating cases the dosage should not be repeated oftener than once in twenty-four hours, unless the symptoms become intensified. Every case, regardless of severity, should receive at least four injections of serum and if diplococci persist after the fourth dose a continued daily dosage until they have disappeared.

Infection of Middle Ear with Vincent's Organisms.—J. Adam (*Brit. Jour. Child. Dis.*, 1915, xii, 40) records four cases of otitis media due to Vincent's organisms, spirochetes and fusiform bacilli. The negative features common to these cases were: Absence of much disturbance to the general health, absence of pyrexia, absence of any history of throat infection, absence of the special organisms in

swabs from the throat, absence of special infectivity (for in no case was there any history of a similar affection in the same family, even in the case of the twins one of whom had also a suppurating ear).

The positive features in common were: The constant presence of Vincent's organisms, the frequency of the pneumococcus as compared with other bacteria (three times out of four), chronicity, stinking and profuse discharge, masses of profuse and readily bleeding granulations in the more pronounced cases, erosion of the external parts of the ear, slight tendency to the formation of membrane, though it is probably always present at some stage but not readily visible owing to the anatomy of the parts and predominance of granulations, erosion of the external parts of the ear, and slight glandular enlargement. In these four cases it has proved to be a local infection. Probably infection of the ear with Vincent's organisms is more common than has been supposed, else it is not likely that three cases would have turned up at one hospital in six months.

Renal Infantilism.—L. Porter (*Arch. Pediat.*, 1915, xxxii, 85) reports two cases as of the type which has been described as renal infantilism. In such cases the infantilism varies in degree, but it is usually marked; the mental power may be but slightly impaired or even, as in this case, extremely good. The mental development is said in most cases to correspond to the stature rather than to the age of the patient. When there is no organic disease in the kidney and the renal element is expressed merely by polyuria, the infantilism is apt to be less extreme. In a number, though not in all, of the cases genu valgum was a marked feature and seems to express the beginning of a final stage in the disease. The striking symptoms common to all the cases reported polydipsia, polyuria, thirst, enuresis and dry skin. The symptoms may have existed from birth or may have begun in the earlier years of the child's life; in the first group the infantilism would be most extreme. The writer's first case, a boy seven and one-half years old, weighed only $32\frac{1}{2}$ pounds and showed signs of rickets, knock-knee, flat-foot, congenital heart disease and polyuria with low specific gravity and a few granular casts. The second case, a boy of six and one-third years, is described as one of true renal infantilism without cardiac involvement, with pyelonephritis and congenital malformation of the urethra. He died from uremia before the characteristic skeletal changes had occurred.

Treatment of Persistent Diphtheria with Diphtheria Endotoxin.—R. T. Hewlett (*Lancet*, Feb. 16, 1915) reports five cases of persistent diphtheria infections following an attack of diphtheria by means of one or more injections of diphtheria endotoxin prepared by the Macfadyen method, four of them successfully. Up to date twenty-four cases of persistent diphtheria infection have been treated with endotoxin. Of these cases, in seventeen the bacilli disappeared within a reasonable time after the use of the endotoxin; in one the bacilli did not disappear until seventeen days after the last dose of endotoxin, and in six the treatment was unsuccessful. Some of the failures were those first treated, and the doses were smaller than now employed. The treatment recommended is to give doses of 0.5 c.c., 1.0 c.c., and

(if required) 1.5 c.c. at intervals of about seven days. In no case has any untoward effect been noticed. The endotoxin is injected into the muscle of the upper arm or back, and gives rise to some pain, tenderness, and swelling, lasting a day or two, at the site of injection, and occasionally to some malaise, rash, and rise of temperature. Thus in 75 per cent. of the cases the use of the endotoxin has been followed by disappearance of diphtheria bacilli.

Cutaneous Regional Variation in the von Pirquet Reaction.—At the suggestion of von Pirquet, J. A. Colliver (*Arch. Pediat.*, 1915, xxxii, 92) has investigated the susceptibility of the skin of various portions of the body to his cutaneous tuberculosis reaction. Tabulating the results in fifty cases, Colliver finds that there is no good reason for making the Pirquet tubercular cutaneous test elsewhere than on the forearm, and this location has the advantage of being more convenient.

Use of Liquid Paraffin in Infants.—H. K. Hill (*Arch. Pediat.*, 1915, xxxii, 96) asserts that in the chronic constipation of infants, liquid paraffin in large doses gives the best results he has yet obtained. In severe gastroenteritis and ileocolitis its use was disappointing, possibly because too small doses were given. In conjunction with lactic acid bacilli very remarkable results may be obtained in that group of diseases which are caused by the action of putrefactive or allied poisons absorbed from the intestines and finding a favorable, susceptible, sympathetic nervous system.

Voice Sign in Chorea.—W. B. Swift (*Amer. Jour. Dis. Child.*, 1915, ix, 132) says that the technic for eliciting the voice sign in chorea is to request the patient to sound a prolonged "a" as in "are" and to watch for the changes in vocal pitch and intensity which constitute the sign. A contraction occurs in the expiratory muscles, the sound will markedly change in intensity and for the rest of the utterance, or until the occurrence of another contraction, the sound will return to its previous evenness of utterance. If during the sounding of "a" there occurs a choreic contraction in or near the vocal cords so that they are made more tense, the tone of that sound of "a" is thereby raised in pitch and then resumed at its previous level.

Results of Treatment with "Eiweissmilch."—Leo Baron (*Jahrb. f. Kinderheil.*, March 8, 1915) gives the results of the treatment of children in the Infants' Clinic at Charlottenburg since 1909, with "Eiweissmilch." During that period eighty-five children were placed on this form of feeding. The milk was coagulated and reinforced with buttermilk and water, equal parts. Milk sugar was added when necessary. At first small amounts of the food were used; later they were increased and sugar added. The author classifies the cases thus: 49 of simple dyspepsia, 7 of secondary dyspepsia, 7 of diarrhea, 18 of alimentary intoxication, and 4 of follicular enteritis. The age varied from three months to a year. Some of the children were at first subject to vomiting and diarrhea. He divides his results into four categories: good results, when within ten days the stools were normal and weight increased; favorable cases, when within two weeks the stools improved, but there was only slight increase of weight;

poor results when after fourteen days there were still undigested stools; bad results, when stools remained bad and weight was lost. Out of forty-nine cases of dyspepsia there were 55.1 per cent. of good results. Stools improved in one or two days and weight increased. Of the seven secondary dyspepsias; in four cases there were no results. Of the seven cases of simple diarrhea there were 89 per cent. of good results. In alimentary intoxication the results were not so good. Of the eighteen cases there were five positive results. Five children came in in severe collapse and should be ruled out of the results. Of the four cases of follicular enteritis there was no improvement in one. Final results are tabulated thus: 29 good results, 15 favorable, 16 poor, 25 bad; that is, 51.8 per cent. positive and 48 per cent. negative results. While not an absolute cure this is an excellent method of feeding in diarrheal disease.

Serum Therapy in Diphtheria.—Ludwig Knospel (*Jahrbuch. f. Kinderheil.*, March 8, 1915) says that the use of antidiphtheritic serum by intramuscular injection permits of the introduction of larger amounts of the antitoxin and greater effects on the poisons in circulation than was formerly possible. Thus the mortality has been reduced. The author gives his results from treatment of 443 cases of diphtheria at the Kaiser-Franz-Josef-Hospital in Karlsbad. In the past year a much larger dosage has been used than ever before. Much better results have been obtained in cases of postdiphtheritic heart failure and paralysis. In very severely infected cases he gave 4500 antitoxin units intramuscularly. A more concentrated serum was used in extreme cases. The author tabulates all the results obtained by him. He shows that under this treatment mortality has been reduced. In laryngeal cases recoveries have increased from 20 to 33 per cent. He concludes that the use of large doses of serum intramuscularly or, when needed, by means of intramuscular combined with intravenous injections, has reduced notably the mortality of this serious disease. He has not observed any anaphylactic effects. Primary tracheotomy seems to give as good results as intubation. Cases of heart failure and paralysis are treated by increased doses of antitoxin. To prevent anaphylaxis there are several methods. Friedberger's method of injection of some foreign serum is useful. When the membrane persists too long pyocyanase is useful.

Serum Anaphylaxis in Men.—George Bessau (*Jahrbuch f. Kinderheil.*, March 8, 1915) gives us a study of antianaphylactic conditions in mankind. He studied children which had received large doses of serum for therapeutic effects. They were treated with scarlet fever, tuberculosis, and pneumococcus sera. The author finds that the efflorescences were not due to anaphylaxis because they occurred in the antianaphylactic phase. He gives his conclusions thus: In normal serum sickness antianaphylaxis may be established by intracutaneous treatment. It occurs only in the severe cases of serum-sickness. The serum exanthem occurs generally in the antianaphylactic phase; so that the exanthem efflorescence cannot be the result of local antigen antibodies. The antianaphylaxis of serum sickness is nonspecific, that is, in any serum sickness from horse serum, a

sensibility to pig serum may be caused side by side with that to horse serum. The antianaphylaxis of serum sickness cannot be considered an absorption antianaphylaxis. How far it may be a poisoning will be seen later.

Preoperative Diagnosis of Tuberculous Mesenteric and Retroperitoneal Glands.—E. H. Risley (*Bost. Med. and Surg. Jour.*, 1915, clxxii, 253) presents an analysis of thirty cases operated on at the Massachusetts General Hospital for some more or less acute abdominal condition, and in which definite mesenteric or retroperitoneal glands were found at operation. He says that *tabes mesenterica* is often a primary disease, with sometimes a fairly distinct clinical history and signs. It most often simulates acute appendicitis, and when in this stage should demand surgical intervention. In the absence of palpable glands, however, it is impossible to make a correct preoperative diagnosis in many cases, there being no symptom-complex distinctive enough of this condition. A great many people harbor tuberculous mesenteric glands in various stages of activity without symptoms. The disease has two clinical types: (a) a slowly progressing one, generally with palpable glands; (b) an acute fulminating type, most often simulating and impossible generally to differentiate from appendicitis. The prognosis in the subacute stage is good without operation. In the acute stage exploratory laparotomy should be done, but the glands not removed unless there are definite indications either from adhesions, ulceration or size of mass producing pain or mechanical obstruction. In children and young adults with a history of right-sided abdominal pain, with or without palpable masses, *tabes mesenterica* should always be considered as a possibility.

Energy Metabolism of Hospital Children.—Ten infants ranging in age from two months to twelve months and in nutritive condition from the last stage of *marasmus* to considerably overweight, were compared by J. R. Murlin and B. R. Hoobler (*Amer. Jour. Dis. Child.*, 1915, ix, 81) as to their heat production both on the basis of weight and of surface area. The heat production was calculated from the oxygen absorption with knowledge of the respiratory quotient (corrections being made for temperature, barometric pressure, and composition of the air) and from the nitrogen of the urine. Graphic records of the respiration (in all cases) and of the pulse (in all but three cases) were obtained, these recording devices serving also to exhibit plainly on a smoked paper the degree of quiescence of the subject. The approximate specific gravity was determined by Kastner's method in the hope that it might serve as a measure of the proportion of fat to active tissue. The child was fed immediately before the observation each day and in nearly every experiment slept at least one, often two hours, while the respiratory exchange was being measured. The authors conclude that the specific gravity, even if accurately measured, cannot serve as a measure of the proportion of fat to active tissue, because, according to the analyses of Sommerfeld, Steinitz, and Steinitz and Weigert the fat replaces only water, the nitrogen remaining constant for children of widely differ-

ent nutritive condition and nearly the same age. The heat production for the sleeping period averages for the ten children 2.7 calories per kilogram and hour. It is highest on this basis for the atrophic and underweight children and lowest for the fattest child. On the basis of a square meter of surface the heat production of normal children shows a decided increase from the early months (2-4) to the later months (6-12) of the first year. The average of all the ten children is 39.7 calories. The average deviation from the mean heat production in all sleeping periods is about ± 10 per cent. for each of the several formulas expressing the relation of surface area to weight (Meeh, Lissauer, Howland and Dana). The algebraic mean deviation is least with the formula of Meeh. Almost identically the same average heat production per unit of weight and per unit of surface is obtained when all the infants between two and twelve months in Howland's, Benedict and Talbot's and the writers' series (sixty-one in all) are compared, *i.e.*, 2.7 calories per kilo and hour, 39.3 calories per square meter and hour (Meeh). On the unit of weight all but three of the atrophic and underweight children (forty-eight in all) lie above the line represented by 2.5 calories per kilogram and hour; all the normals (eighteen) lie near this line; and all but one of the overweight infants (five) lie below the line. Two and one-half calories per kilogram and hour or 60 calories per kilogram and twenty-four hours may therefore be called tentatively the "normal heat production" of recently fed, sleeping infants between two months and one year of age. Included in this figure is whatever dynamic action the foods themselves may have; otherwise the figure is minimal. Hard crying may increase the metabolism as much as 40 per cent.; the requirement for growth and an allowance for nonabsorption must be added. The average deviation from the mean on the basis of weight for all these children is 12.1 per cent.; on the basis of surface area (Meeh) 11 per cent. For smaller age groups of normal children the deviation is considerably less on the basis of surface area than on the basis of weight. Taking into account possible variations in the dynamic influence of food, these results must be regarded as confirmatory of the "law" of surface area of Rubner. There seems to be no sufficient reason, however, for estimating the food requirements of infants on the basis of surface area rather than on the basis of weight.

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ORIGINAL COMMUNICATIONS

A STUDY OF THE COMPLICATIONS OF OVARIAN TUMORS.*

BY

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THIS paper is based upon a series of 240 consecutive operations for ovarian tumor performed on the first and second gynecological services of Mount Sinai Hospital. Parovarian tumors, being so closely allied to ovarian, are included in the series. The operations were performed by the various members of the visiting staff and by successive house surgeons. As there were bilateral tumors in twenty-nine cases, there were 269 tumors in all. No attempt has been made to include all the possible complications which may occur with ovarian tumors. The discussion has been strictly limited to those which occurred in this series of cases. It includes all those which are more commonly encountered and a few of such as are of less frequent occurrence.

The tumors encountered were classified as follows:

Simple serous cystadenoma.....	110
Dermoid cyst.....	60
Papillary serous cystadenoma.....	27
Pseudomucinous cystadenoma (17 "simple," 1 papillary).....	18
Parovarian (8 simple serous, 2 papillary).....	10
Corpus luteum cyst.....	4
Fibroma.....	3
Fibromyoma.....	1
Teratoma (1 solid, 4 cystic; 3 tumors contained thyroid tissue).....	5

* Read in part before the New York Obstetrical Society, April 13, -915.

Sarcoma (3 large round-celled, 1 fibrosarcoma).....	4
Carcinoma.....	24
Unclassified.....	3

In the twenty-nine cases in which bilateral growths were encountered they were classified as follows:

Carcinoma.....	8 cases
Simple serous cystadenoma.....	7 cases
Papillary serous cystadenoma.....	6 cases
Dermoid.....	1 case
Teratoma.....	1 case
Pseudomucinous cystadenoma.....	1 case
Serous cystadenoma one side, parovarian on other side	3 cases
Serous cystadenoma one side, pseudomucinous on other side.....	1 case
Serous cystadenoma one side, dermoid on other side.	1 case

Twenty-three of the tumors were intraligamentous; nineteen simple serous cystadenomata, two dermoids, one parovarian cyst, and one papillary serous cystadenoma.

The complications will be discussed under eight headings—torsion, rupture, infection, malignant degeneration, pregnancy, ascites, “miscellaneous,” and postoperative complications and mortality.

TORSION.

Etiology.—This is by far the most frequent complication. In our series it was encountered thirty-three times in 269 tumors (12.26 per cent.). As to the variety of tumor, there were sixteen serous cystadenomata, ten dermoids, three papillary cystadenomata, two multilocular pseudomucinous cystadenomata, one fibromyoma, and one fibrosarcoma, thirty-one cystic and two solid growths.

Much has been written as to the etiology and mechanism of axis torsion, most of it in the realm of theory and speculation. Among the numerous causes which have been assigned are trauma, such as a sudden jolt or fall, sudden changes of posture, manipulation during examination, intestinal peristalsis, pressure of the gravid uterus, uterine contractions, etc.

It is self-evident that the tumor must be pedunculated, yet the pedicle may be very short and broad. Of course, the absence of strong adhesions and mobility of the tumor are necessary factors. It is conceivable that a sudden jolt or a fall may give rise to the twist. One of our patients dated all her symptoms from a fall on the buttocks three months prior to admission. It is also conceivable that the powerful uterine contractions during labor might exert sufficient

force to turn a movable tumor to a sufficient degree to cause it to fall over by its own weight and so twist its pedicle.

That the sudden emptying of the large pregnant uterus in labor will cause an ovarian tumor which has been pushed up into the abdomen to drop suddenly, and in so doing have its pedicle twisted, is also conceivable. That pregnancy is not a necessary, or even a frequent factor in the etiology of torsion is shown by the large number of nulliparæ in our series (20 per cent.).

It is natural that this complication should be more frequent in women over thirty years of age, for the longer they carry their tumor the better the chance of its pedicle becoming twisted. Our youngest patient was twenty-one and the oldest sixty-two.

That as weak a force as intestinal peristalsis should move an ovarian tumor to any extent hardly seems plausible. The influence of a difference of density and specific gravity in different portions of the same tumor upon a rotary motion is an interesting point. Thus two of our cases were simple cysts with solid fibromata growing in their walls. Yet often enough the tumor was a simple unilocular cyst with serous contents, and solid homogeneous growths seem specially prone to this complication. Doubtless their weight contributes to this. Large tumors seem quite as susceptible to this accident as small; indeed it may be said that any tumor which is not too large to turn over within the abdomen may undergo an axis torsion. The twists found in enormous tumors must occur before they have attained such size.

By far the most ingenious contribution, to this subject, and one deserving of greater attention than it has hitherto obtained was made by Jolly(1). His contention is that the "*causa movens*" which gives rise to the twist is the continuous growth of the tumor itself—its expansile force. The tumor in growing eventually presses upon the pelvis or abdominal wall; here it meets with firm counterpressure. In order for a twisting motion to take place, Jolly contends that there must be an unequal tumor mass on either side of the pedicle. Given these conditions, the pedicle acts as a fulcrum and the tumor mass of unequal size acts as a one-armed lever upon this point of leverage. As the tumor grows the counterpressure from the pelvic or abdominal wall must cause a rotary motion upon this point of leverage (pedicle), and when the tumor has been turned to a sufficient degree it will fall over by its own weight. This process repeats itself as the tumor grows. For a more detailed description of this clever explanation I must refer to the original monograph.

Pathology.—The changes induced in a tumor by a twist of its pedicle depend less upon the degree of torsion than the condition of its blood supply; one complete turn with occlusion or thrombosis of the vessels in the pedicle will give rise to far graver lesions than three complete turns without a marked circulatory disturbance. The degree of interference with the blood supply will depend both upon the thickness of the pedicle and the rapidity or slowness with which the torsion occurs. The minor changes are by far the more frequent, hemorrhage into the cyst cavity, hemorrhage into the wall of the cyst, loss of surface epithelium with formation of adhesions. Omental adhesions are the most frequent. Microscopic necrosis is fairly common in the severer cases. Actual gangrene was encountered in three of our cases, in all of which the vessels in the pedicle were thrombosed. Once this was limited to the Fallopian tube which formed part of the pedicle, once the pedicle and adjacent cyst wall were involved, and in one case the entire cyst wall was black and necrotic. That this can give rise to perforation and serious peritonitis is evident.

Five of our cases had free fluid in the peritoneal cavity; in none did we encounter a severe peritonitis. Complete constriction of the lumen of the intestinal tract causing a mechanical ileus must be a rare complication of torsion. Gronarz(2) reports a case in which a loop of small gut became entangled with a twisted pedicle and rotated with it to a sufficient degree to cause acute intestinal obstruction.

Very interesting are those cases in which the torsion and shutting off of the blood supply have occurred so slowly that the tumor has had time to develop a new blood supply through the formation of adhesions, and so retains its viability, even though completely separated from its original pedicle. Ivens(3) reported a case of a calcified dermoid the size of a fetal head. The great omentum was spread over and adherent to the tumor. The appendix and right tube were also adherent; the tumor itself was fixed by a broad base to the anterior surface of the right broad ligament and the peritoneal surface of the bladder; there was no trace of the original pedicle. In a case reported by Le Moniet(4) a dermoid had separated from its pedicle and was adherent to the lower border of the great omentum.

There was one such case in our series, a dermoid cyst attached only to the great omentum.

CASE REPORT.—Annie A., aged thirty, service of Dr. Krug. Married eleven years, two children, youngest four years old; three abortions, the last one six months ago.

Menstruation regular every four weeks, lasting seven days, no pain; last period one month ago.

Present illness began six months ago following the last abortion; ever since then constant pain on both sides of the abdomen low down. The abdomen was relaxed and there was a mass palpable below the umbilicus. By vagina an elastic tumor the size of a cocoanut could be palpated in front of the small uterus.

Laparotomy.—A large dermoid cyst with Fallopian tube lying almost in the midline attached only to the omentum; no connection whatsoever with the uterus; the right tube and ovary missing. Omentum ligated and tumor resected.

Specimen.—Fallopian tube with a tumor composed of two parts separated by an external constriction; one compartment the size of a grapefruit, the other the size of an apple. On opening the cyst there is a large amount of thick cheesy content, also much hair and a jaw bone with two teeth.

Pathological Report.—Dermoid cyst.

Signs and Symptoms.—These vary with the rapidity of the occurrence of the torsion, and with the degree of interference with the blood supply of the tumor. The degree of torsion *per se* is of minor importance. In a typical case the occurrence of sudden severe pain with nausea or vomiting, increased pulse rate, a rise of temperature, and the palpation of a tumor mass distinct from the uterus will confirm the diagnosis. In all of our thirty-three cases a distinct mass was noted. Where no mass is palpated the diagnosis becomes very difficult and a great many acute intraabdominal conditions have to be considered. Among others, rupture of an ovarian cyst, acute inflammation of the adnexa, appendicitis, peritonitis from perforation of stomach, intestine, or other hollow viscera, renal ureteral, or gall-stone colic, acute pancreatitis, visceral crises of the erythema type.

Nausea and vomiting are very characteristic symptoms and occurred in 50 per cent. of the cases.

Sudden attacks of severe intraabdominal pain are most characteristic of all. These may be repeated at intervals of weeks or months. This symptom was present in every case in which the tumor showed serious lesions as a result of interference with its blood supply.

Abdominal distention is, as a rule, not marked.

Dysuria and constipation are variable and valueless symptoms. We did not encounter an actual ileus. One case, that of a simple cyst whose pedicle was twisted two and one-half turns and in which gangrenous changes had set in, gave a history of complete intestinal obstruction of three days' duration. An ox gall enema

administered in the Trendelenburg posture proved effectual in moving the bowels.

Uterine hemorrhage is the exception rather than the rule. Five cases had menorrhagia and one metrorrhagia. In the rest, menstruation was normal in type. Rapid growth of the tumor due to exudation caused by interference with the venous return is a valuable symptom when the size of the tumor has been noted before the occurrence of torsion.

Increase in pulse rate was a fairly constant symptom, but was not marked except in the cases with gangrene. A slight rise in temperature was a frequent occurrence. The highest temperature (104° F.) was in a case of fibrosarcoma with considerable bloody ascites but no necrosis of the tumor. Neither the pulse rate nor the temperature are safe guides as to the seriousness of the lesion present.

Well-marked rigidity of the abdominal wall was exceptional, being present in only four cases. Two of these were not of a serious type. Voluntary contraction of the abdominal muscles during examination and the condition known as "peritoneal irritation" were of more frequent occurrence. The leucocyte count was markedly increased in the gangrenous cases with relative increase of the polynuclear leucocytes. It was not made in a sufficient number of the milder cases to warrant any general deductions.

Urinary changes were not frequent. Broese(5) believes that there frequently is an intoxication in these cases giving rise to an acute parenchymatous nephritis. I have been unable to corroborate his contention. Excluding such patients as obviously had some degree of chronic nephritis, albumin was found in the urine eight times in our cases. In only three cases did the urine contain casts in moderate numbers in addition to the albumin. In all of these the urine cleared up before the patients left the hospital.

Treatment.—The sole point of interest is the degree of urgency with which operation is indicated. While operation will rarely be imperative within a few hours of the time the patient is first seen, there are undoubtedly cases in which even a brief delay will give opportunity for necrosis, rupture, or serious infection. The general condition and appearance of the patient are the only safe guides to follow.

RUPTURE.

Etiology.—There were five cases of rupture of the cyst wall in the series. Two serous cystadenomata, two pseudomucinous cysta-

denomata, and one corpus luteum cyst. In none of these was there any distinct history of trauma as an etiological factor. There are many cases recorded in which violent symptoms due to cyst rupture came on immediately after sudden exertion or after a fall or other injury.

The trauma may be exceedingly slight, *e.g.*, the act of sneezing or of vomiting. Tedenat(6) saw a large cyst rupture on light percussion during abdominal examination. The patient had a sensation of vague pain and passed urine very freely for four or five days. During the month in which she remained under observation the tumor did not reform. However, injury must be looked upon as a secondary cause of rupture, the primary cause being a weakening of the connective tissue of the cyst wall. This may be due to increased intracystic pressure caused by a rapid increase in the cyst contents, *e.g.*, in torsion or suppuration, by pressure of other tumors from without (fibroids, pregnancy), or it may be due to destruction of the connective-tissue capsule through penetration by the epithelial elements of the cyst. This latter process can be typically seen in papillary growths.

Symptoms.—At the moment of rupture these may be entirely absent, or there may be such extreme pain as to cause the patient to faint. It is a not unfamiliar occurrence to have a small cyst of the ovary rupture during bimanual palpation without giving rise to any pain or subsequent symptoms. If it has been a simple retention cyst it may never reform, and the patient is "cured." True cystadenomata usually reform after such an occurrence.

The symptoms subsequent to rupture will depend upon the character of the cyst contents evacuated into the peritoneal cavity, and upon the susceptibility of the individual peritoneum thereto. They will vary therefore from those of a mild peritoneal irritation to those of the most intense peritonitis. Late symptoms will in certain instances be those of secondary peritoneal growths ("implantation metastases") and chronic peritonitis. Brief synopses of our cases follow:

CASE REPORT.—Simple serous cystadenoma. Ida K., aged thirty-eight, Surg. No. 116263, service of Dr. Brettauer. Married twenty-two years, twelve children, last child seventeen months ago. She aborted eleven weeks ago and was curetted at the Harlem Hospital.

Present Illness.—After the curettage she was "clean" until this morning, when she began to bleed profusely; she has slight pain on the left side.

Examination.—Abdomen soft and relaxed. Uterus anterior,

somewhat enlarged. Right adnexa enlarged and cystic, left not felt. Pulse and temperature normal.

Laparotomy.—Few ounces of blood-stained fluid in the peritoneum; ruptured collapsed right ovarian cyst; salpingo-oophorectomy.

This was a case in which the cyst contents were evidently but slightly irritating and the symptoms were not marked—the patient was not very sick.

CASE REPORT.—Multilocular serous cystadenoma. Elizabeth H., aged thirty-six, Surg. No. 109122(a), service of Dr. Krug. Married seven years. One child three years old; no abortions. For two years the periods have been irregular, occurring q. two to three weeks, duration four to five days. Pain in back and lower pelvis between periods, aggravated by walking.

Present Illness.—About twenty hours ago, in the middle of the day, she suddenly felt severe sticking pain in the right lower abdomen and fainted. Upon recovering she experienced moderate pain which ceased ten hours ago. No vaginal bleeding.

Examination.—General condition good; temperature 101° F., pulse 102. Abdomen lax and tympanitic. Uterus enlarged, pushed forward and to the right by a semicystic mass on the left side about the size of an orange; this is moderately tender.

Laparotomy (twenty-four hours after admission).—About 5 ounces of dark bloody fluid in the abdomen. On the left side a ruptured multilocular cyst, with several loculi still intact. Salpingo-oophorectomy. The temperature reached normal three days after operation.

In this case the rupture, though small, gave rise to the most intense pain. The more irritating character of the cyst contents was evidenced by the rapid pulse and the rise of temperature. Of special interest are the two cases of ruptured pseudomucinous cyst, as in both of them rupture was followed by implantation metastases.

CASE REPORT.—Multilocular pseudomucinous cystadenoma. Becky G., aged fifty-nine, Surg. No. 111451, service of Dr. Krug. Married thirty-eight years, eight children, no abortions, menopause twelve years ago.

Present Illness.—For six months slight pain in the lower abdomen; for two months she has felt a hard intraabdominal mass which she thinks is rapidly increasing in size.

Examination.—Occupying the entire abdomen from 4 inches above the pubis to 4 inches below the sternum there is an elastic, irregular, slightly moveable tumor. Pulse and temperature normal.

Laparotomy.—Tumor found to be a large multilocular cyst the size of a watermelon which had ruptured. There was a large quantity of gelatinous material in the abdomen; all the visible areas of parietal and visceral peritoneum were covered with small gelatinous

cysts. The uterus was small and hard, there were numerous cysts on its surface. Panhysterectomy. The patient was discharged from the hospital with a soft relaxed abdomen, and without palpable masses. Here subsequent history is unknown.

In this case the sole symptoms were those caused by the pressure of the immense growth. The extensive character of the implantation metastases points to a rupture long before the time of operation. The lack of diminution in the size of the tumor after rupture is accounted for by its multilocular structure and by its thick tenacious contents.

The second case of ruptured pseudomucinous cyst has already been published *in extenso*, but its importance warrants repeating the history here.

CASE REPORT.—Lizzie S., aged twenty-three, unmarried, Surg. No. 126178, admitted October 28, 1911. Menses began at thirteen, regular every four weeks, duration seven days, flow moderate with slight pain. Three months before admission she had a fall and began to bleed per vaginam; this flow lasted three or four days. Since then she has been bleeding every two weeks. She has had abdominal cramps for one month, and right iliac pain for a week. No vomiting, urination normal, bowels constipated.

Examination showed the abdomen protruding, tense, and almost entirely filled by a nontender cystic mass. On November 1, a laparotomy was performed by Dr. Florian Krug. The abdominal cavity contained a slight amount of free fluid, slightly bloody, and an enormous cyst springing from the left ovary. In the delivery of the cyst some of its loculi were ruptured. This part of the cyst wall had been strangulated by being caught in a hole in the omentum. This portion of the omentum was subsequently resected. The extravasated fluid was at once sponged away, the pedicle ligated, and the cyst removed. The right ovary was normal in appearance. Abdomen closed by layer suture. Specimen: multilocular cystic tumor weighing 7 pounds, reddish and whitish in color, with gelatinous contents.

Pathological Report.—"Multilocular pseudomucinous cystadenoma. In places the hypertrophy is so great that the picture is almost that of a malignant adenoma."

Convalescence was uneventful and the patient left the hospital apparently well in two weeks. She continued to feel perfectly well for almost two years. On August 18, 1913, she was admitted, with the following history. Since operation her menstrual periods had been perfectly regular until two months ago. Since then she had bled irregularly at frequent intervals. For four weeks she had some bleeding daily; for three weeks she had dull aching pain in the right lower quadrant of the abdomen, and again noticed an increase in its size. No vomiting, bowels regular, no urinary disturbance. Her general condition was only fair; appearance somewhat anxious and

worn; hemoglobin 82 per cent. Examination revealed an elastic fluctuating mass reaching from the symphysis to two fingers above the umbilicus; small virginal cervix, slightly softened; the uterus could not be made out.

From the time of admission until operation the temperature ranged from 100 to 102, the pulse from 100 to 120. On August 21, a second laparotomy was performed by the writer. An incision was made through the old scar. The peritoneum was found much thickened and congested; there was considerable clear, amber-colored ascitic fluid. A large cyst was found springing from the right ovary. Before any attempt at delivery of the cyst it was noted that there was a ragged spontaneous tear into its lumen close to the pedicle with glairy gelatinous contents exuding. The cyst wall was everywhere smooth, and as there were no adhesions it was easily delivered, its pedicle ligated and cut away. The intestinal serosa was markedly congested; there were numerous small gelatinous cystic masses all over the peritoneum, especially in the pelvis. It was obviously impossible to remove these and the abdomen was closed without drainage.

Specimen.—Smooth multilocular cystic tumor 25 cm. in diameter; 5 cm. from the pedicle there is a ragged linear tear into the lumen of the cyst exposing several loculi.

Pathological Report.—"Pseudomucinous cystadenoma of the ovary." Pulse and temperature remained normal after the operation and the patient was able to leave the hospital in two weeks. The wound was firmly healed, she felt well, and the abdomen was flat without signs of ascites; nor was anything abnormal to be palpated bimanually.

Five weeks later I saw her at her home. She had been forced to take her bed within three weeks after leaving the hospital by increasing size of her abdomen, nausea and vomiting, obstipation, and progressive weakness. She was pale and emaciated, suffering intense abdominal pain, and markedly dyspneic even in a semireclining posture. Her abdomen was enormous and in marked contrast to the general emaciation. There were all the classic signs of a huge ascites. The abdomen was tapped with a trocar and canula and 6 quarts of bloody fluid withdrawn. The procedure relieved the dyspnea and enabled her to retain more substantial food. Unfortunately, the relief was only temporary and in spite of a second tapping she died two months after operation with the picture of a malignant ascites. A postmortem was refused.

I have elsewhere(7) in discussing this case pointed out that this histologically benign type of adenoma of the ovary "can cause death just as surely and just as swiftly as an adenocarcinoma." The usual method in which this type of growth causes death is, as is so well illustrated by the above case, by perforation of the capsule, extravasation of the contents, and peritoneal metastases. The

clinical picture is indistinguishable from that of a general abdominal carcinomatosis.

The last case of our series to be reported, a ruptured corpus luteum cyst, is of interest because the rupture was accompanied by an intraperitoneal hemorrhage, the whole picture closely resembling that of a ruptured ectopic gestation.

CASE REPORT.—Annie M., aged twenty-seven, Surg. No. 140215, service of Dr. Krug. Married five years, two children, last child one and one-half years ago. No abortions.

Menstruation regular q. four weeks, flow seven days, profuse. Last period three weeks ago.

Present Illness.—For one month attacks of pain in the lower right abdomen. Dysuria and leukorrhea for two weeks. Yesterday she was examined in the admitting room of the hospital and told to return to her home until she received notice to come to the hospital for operation. On the way home there was a sudden onset of severe abdominal pain and the patient fainted on the street. Since then there has been constant general abdominal pain of moderate degree and some shortness of breath.

Examination.—The abdomen is tender and slightly rigid over its entire lower half; there is a dark bloody vaginal discharge; the uterus is small and anteverted. To the right of the uterus there is a tender elastic mass the size of a mandarin orange. Temperature 100° F., pulse 116. Diagnosis, ruptured ectopic gestation.

Laparotomy.—The abdominal cavity contained a moderate quantity of free dark blood. On the right side a perforated corpus luteum cyst. Oophorectomy with partial salpingectomy. Neither tube showed any evidence of distention, rupture, or abortion.

It is quite possible that the manipulations during bimanual examination in the admitting room of the hospital caused a hemorrhage into the cyst cavity, and this in turn gave rise to the bursting of the cyst, coincident with which the patient experienced intense pain and fainted on the street.

Severe hemorrhage as a result of cyst rupture, while not frequent, is by no means a rare occurrence. Boldt(8) reported a fatal case before this Society some years ago. The character of the cyst was not stated. A pelvic hematocele with considerable free blood, the result of rupture of a "multilocular ovarian cyst," was reported by Kynoch(9). The right ovary was the seat of a cyst with a rent into its wall and a blood clot protruding. There was no evidence of ovarian pregnancy.

The recent literature shows a number of cases of profuse hemorrhage from ruptured corpus luteum cysts and cystic Graafian follicles. Thus Primrose(10) reports a case of profuse hemorrhage

from the accidental rupture of a corpus luteum. While lifting a heavy chest the patient experienced sudden severe pain in the lower part of the abdomen. She became nauseated and had frequent attacks of vomiting with continuance of the pain. Twelve hours after the onset the temperature was subnormal, pulse 130, with marked distention of the abdomen and uniform rigidity. Per vaginam a mass was felt which crowded the uterus down and fixed it firmly. At operation there was a large quantity of free blood in the abdomen with clots in the pelvis. The left ovary was enlarged; upon its upper free border there was a ruptured cyst the size of a hazelnut. Arterial blood was spurting from a definite point.

Pathological Report.—Corpus luteum with evidence of recent rupture. There was no pregnancy. Primrose also reports(10) a hemorrhage into the peritoneal cavity due to a ruptured Graafian follicle complicating an attack of acute appendicitis. He attributes the rupture to the strain of a violent attack of vomiting induced by the appendicitis.

Another case of hemorrhage from a ruptured degenerated cystic follicle is reported by Tschudi(11). The cyst was about the size of a small apple with a tear $2\frac{1}{2}$ cm. long. No known etiology.

In Adams' case(12) of ruptured corpus luteum cyst there was considerable free blood in the abdomen. The patient was a nullipara aged eighteen. There was a sharply defined puncture in the cystic ovary from which blood was oozing freely at the time of operation. No known etiology.

Cases of ruptured corpus luteum closely simulating ectopic gestation have been reported by Benthin(13) and by Cromwell(14). The most recent case reported is that of Bookman(15).

Diagnosis.—This can be made with certainty only when a tumor which has been distinctly palpated disappears. Rupture may be suspected when a previously palpated tumor has diminished markedly in size and tension, and there are evidences of free fluid not previously present. If the tumor remain palpable and without marked diminution in size or tension, there is no single symptom, or group of symptoms, by which to differentiate rupture from other complications. Where no examination has been made previous to the time of rupture and the patient herself has been unaware of the presence of a tumor, it will be practically impossible to make an absolute differential diagnosis from a number of acute intra-abdominal conditions.

Treatment.—The treatment is, of course operative, and the earlier

the operation after the time of rupture the better the prognosis. Whether or not to advise operation when a small cyst has ruptured during examination is a rather nice question. There are undoubtedly cases of simple cyst which remain well after this little accident without operation. Each case of this sort must be a law unto itself and if the patient can be kept under careful observation, it will be safe in some instances to watch for signs of peritoneal irritation or the reforming of the tumor. If neither develop the tumor may be considered to have been a simple cyst with nonirritating contents, and the patient be looked upon as "cured."

INFECTION.

Etiology.—A considerable number of microorganisms have been found in infected ovarian tumors. Thus there are on record infection with streptococci (Cumston[16]), staphylococci, pneumococcus (Rissman[17]), gonococcus (Brettauer[18]), tubercle bacillus (Madelener[19]), Polosson[20], Pruessman[21], Coe[22], Celler[23], Rosenthal[24]), bacillus typhosus (Werth[25], Sudeck[26], Pitha[27], Bland-Sutton[28], Taylor[29], Maldague[30], Coe[22], Gans[31], Maier[32]), colon bacillus (Loehlein[33], Menge[34]), and various saprophytic organisms.

In our series there were six cases of infected cysts (2.23 per cent.). There was one case of streptococcus infection, one mixed infection of streptococcus pyogenes and staphylococcus albus, one case of typhoid infection, in one case culture showed no growth, and in two cases the organisms were unidentified. Many authors lay stress upon the fact that the majority of infections occur in dermoids. No explanation of this phenomenon has as yet been forthcoming, except on purely theoretical grounds. Our cases were divided as regards the nature of the tumor as follows: dermoid cyst two cases, serous cystadenoma two cases, corpus luteum cyst one case, and multilocular pseudomucinous cystadenoma one case.

Peterson(35) has classified the routes taken by the infecting microorganisms as follows:

1. They may pass through the cyst wall either from the peritoneal cavity or from some adherent viscus rich in germs (intestine, appendix, bladder, tube).

2. Through the circulation; either directly through the arterial circulation of the pedicle, or by way of the venous circulation after the formation of a thrombophlebitis—a retrograde infection.

3. Infection may take place by way of the lymphatics.

4. By aspiration or puncture through the abdominal wall or vagina.

This last method of infection was doubtless very frequent in the olden days when tapping constituted the only available treatment for cystomata. Fortunately, it need no longer engage our attention. That direct infection from the circulation can occur, as for example in typhoid fever, has been shown practically beyond dispute. For the majority of cases it will hold true, just as for pelvic infections in general, that they originate in the uterine cavity, and follow upon abortion, labor, or instrumentation. The direct causal connection between the endometrial infection and the infection of the ovarian growth may not be easy to trace. But it should be borne in mind that microorganisms may remain latent for long periods after their introduction into the pelvis.

Without attempting to prove a direct causal relation in our cases, it is worth noting that all but one had passed through labor or abortions. This one case was that of a typhoid infection in a young girl. One patient had passed the menopause ten years previously; in this case the intestine was closely adherent to the cyst. In one case the symptoms began six months after an abortion. In another case there had been a confinement three months before which was followed by a febrile puerperium. One case was operated sixteen days postpartum.

Symptoms.—These are very variable. In addition to the symptoms of uncomplicated cysts, fever is almost invariably present. This may be only slight, or there may be a most intense sepsis, depending upon the virulence of the infecting organism, its localization to the interior of the tumor or spread, and the resistance of the individual. If the infective process passes the restraining barrier of the cyst capsule, peritonitis with all its signs and symptoms is added to the picture. Adhesions to and perforation of adjacent viscera will give symptoms of involvement of those viscera. This must be a rare complication in these days of early operative interference.

Pain is, as a rule, more marked and more persistent than in non-infected tumors. It may be most intense. This is readily explained by the congestion of the cyst wall and the tension caused by a rapidly increasing cyst content.

Of local physical signs marked tenderness of the tumor is perhaps the most trustworthy sign. Increased tension of the tumor can hardly be looked upon as a trustworthy sign. Generally speaking, elevation of temperature, increase in the pulse rate, and

an increased leucocyte count will all be more marked than with any other complication of ovarian tumors.

Synopses of our cases follow.

CASE REPORT.—Dermoid Cyst. Typhoid infection. Rose R., aged thirteen, Surg. No. 109314, service of Dr. Krug. She was admitted to the medical side of the hospital, and went through a typical typhoid fever. The Widal reaction and blood cultures were both positive. She had two relapses, and her temperature reached normal only on the fifty-fifth day of the disease. During her stay in the medical ward the presence of a large abdominal tumor was noted. After she had sufficiently recuperated a laparotomy was performed by Dr. Krug. The left ovary was found converted into a dermoid cyst the size of a child's head. This was resected. Convalescence uneventful. The tumor was a typical dermoid containing sebaceous material, hair, and a piece of bone with a single tooth. Cultures from the cyst contents taken immediately after its removal from the abdomen showed a bacillus which had all the typical characteristics of the bacillus typhosus of Eberth.

There are already more than twenty well-authenticated cases of typhoid infection of ovarian cysts in the literature. Suppuration of such cysts may occur within a few weeks or months of the infection; this seems to be the rule. It may, however, be delayed for years during which the bacillus remains latent. Bland-Sutton(28) reported a case with bacillus typhosus in the pus of a suppurating ovarian dermoid six years after an attack of typhoid fever. This is not surprising when we remember how long the bacillus typhosus can persist in the gall-bladder and kidney. (That the bacillus typhosus can give rise to a suppurative process without a mixed infection is shown very well by the posttyphoid bone abscess.)

In our case a suppurative process was forestalled by the fortunate discovery of the tumor in the course of the typhoid, and its removal as soon as the patient had convalesced sufficiently to withstand the shock of an operation. Whether eventual suppuration is inevitable under such circumstances, or it is possible for the bacillus to die off without giving rise to further mischief, is an open question.

CASE REPORT.—Dermoid Cyst. No growth in culture. Lena F., aged twenty-three, Surg. No. 132295, service of Dr. Brettauer. Menstruation regular q. four weeks; last period three weeks ago. Married three years. One abortion; one child two years ago.

Present Illness.—Began twenty-four hours ago with intense pain in the lower right abdomen, which to-day has spread all over abdomen.

Nausea, no vomiting. Bowels regular, urination normal. No bleeding, no vaginal discharge.

Examination.—Lower portion of the abdomen somewhat rigid, with marked suprapubic tenderness. Bimanually a soft, very tender mass the size of an orange. Temperature 104.6° F., pulse 124. Urine showed plus quantity of albumin.

Laparotomy (four hours after admission).—A few ounces of free fluid in the peritoneal cavity. To the right of and posterior to the uterus a cyst the size of an orange; this was resected. The sigmoid flexure, posterior wall of the uterus, and the site of the cyst were covered with dirty fibrin. The left ovary was normal. Abdomen closed without drainage. The temperature gradually came down to normal in ten days. On the twelfth day the lower angle of the wound opened and discharged some serosanguinolent fluid.

Specimen.—The cyst when opened showed foul-smelling purulent material with some gelatinous masses, teeth, and hair. Culture from cyst—"no growth."

The symptoms in this case were those of a severe intraperitoneal infective process. The etiology of the infection was entirely obscure.

CASE REPORT.—Corpus Luteum Cyst. Streptococcus infection. Frieda G., aged thirty-five, Surg. No. 148618, service of Dr. Krug. Married seven years; one abortion; two children. The last confinement three months ago, was followed by *four weeks illness*.

Present Illness.—Six days ago patient was discharged from the medical side of the hospital where she had been under observation for abdominal cramps, epigastric tenderness, vomiting, and headaches. No definite diagnosis was made. She was discharged "improved." After a few days the cramps recommenced. She vomits occasionally. Pelvic examination shows a small very tender mass to the left of the uterus. Temperature 101° F., pulse 96, urine negative.

Laparotomy.—The omentum found adhering to a mass on the left side; omentum ligated and resected; the mass was now freed from the adherent bladder and delivered into the wound; in so doing there was an escape of a small amount of pus. Salpingo-oophorectomy. Abdomen closed in layers without drainage except for a strip of gauze just under the skin.

One day after operation the temperature rose to 103.6° F., and the pulse to 124; both declined to normal in three days. There was one further rise of temperature to 101.6° F. on the seventeenth day. A small exudate developed at the site of the stump; this was treated by hot air baking, and the patient went home well on the twenty-ninth day.

Pathological Report.—Culture from pus "nonhemolytic streptococcus." The ovary contains a large focus of inflammatory tissue probably the result of infection of a corpus luteum.

It seems hardly open to question that the infection occurred during the labor three months previously which had been followed by a

febrile puerperium. The strict localization of the inflammatory process, and its walling off by dense adhesions, explain the comparative mildness of the constitutional symptoms in spite of the presence of the streptococcus.

CASE REPORT.—Serous Cystadenoma. Mixed infection with streptococcus pyogenes and staphylococcus albus. Libby G., aged twenty-seven, Surg. No. 119781(a), service of Dr. Brettauer. Menstruation regular q. four weeks. Lasting three days, moderate flow, no pain; last period, as usual, two weeks ago. Married nine years; three children; one abortion a year ago; following this was curetted.

Present Illness.—For six months attacks of pain in both iliac regions lasting five to six days and confining her to bed. Never vomited; no history of fever. Defecation and urination normal. Slight leukorrhea.

Examination.—Patient somewhat emaciated. A large intraabdominal mass which is fluctuating and quite soft in its upper part. The lower portion of the mass is hard.

Vaginal.—The cervix lies behind the symphysis; the fundus not palpated. A large cystic mass filling the culdesac of Douglas and extending from 6 cm. from the left pelvic wall to 10 cm. to the right of the median line. The mass is slightly movable. Above this mass on the right side there is another freely movable cystic mass the size of a small grapefruit. Temperature 102.4° F., pulse 104. Urine shows a trace of albumin and an occasional hyaline cast.

Laparotomy.—Large cystic mass in the median line firmly adherent to the small uterus, pushing it downward and to the right. On the right side a flabby ovarian cyst, apple size. The large mass was aspirated and pus obtained. Panhysterectomy with vaginal drainage.

Convalescence was febrile for fourteen days, a large pelvic exudate developing. This was treated with hot air baking. Patient discharged on the twenty-eighth day with a slight exudate remaining.

Pathological Report.—Large abscess in an infected ovarian cyst. Cultures of pus showed streptococcus pyogenes and staphylococcus albus.

The only known possible etiological factor in this case was the abortion which antedated the onset of symptoms by six months.

CASE REPORT.—Serous Cystadenoma. Infection (unrecovered organism). Betsie F., aged fifty, Surg. No. 104633, service of Dr. Krug. Menopause ten years ago. Married twenty-four years; ten children; four abortions.

Present Illness.—For three months almost constant cramp-like pain in the lower half of the abdomen. For one month occasional spotting of blood; discharge odorless. Has lost weight and is growing weaker.

Examination.—Uterus enlarged and soft; to the right and posteriorly there is a mass of harder consistency which feels like malignant

involvement of the right broad ligament. The abdomen is lax and tympanitic. Temperature 102.6° F., pulse 116, white blood cells 16,000, polynuclears 75 per cent. Blood culture negative.

Laparotomy (four days after admission).—On the right side a large cystic mass bound down by dense adhesions to the colon and the pelvic wall. In attempting to free the mass a moderate amount of old blood mixed with pus escaped from what was evidently an old ovarian cyst. Panhysterectomy with vaginal drainage. Convalescence uncomplicated. Temperature reached normal in three days.

The firm adhesions of the cyst to the large intestine would seem to have furnished an easy route of infection in this case. The patient being ten years past the menopause, pelvic infection is very improbable.

CASE REPORT.—Multilocular Pseudomucinous Cystadenoma. Infection with unknown organism. Death. Fannie S., aged thirty-four, Surg. No. 147564, service of Dr. Krug. Menstruation regular q. four weeks lasting three to four days, no pain. Last period ten months ago. Married fifteen years, seven children; *last child born sixteen days ago*.

Present Illness.—Ten months ago, being twelve days overdue the time for her menses, she went to a physician who told her she was then three months pregnant. The abdomen was extremely large all during the pregnancy. Labor said to have been normal. The abdomen did not decrease in size as much as usual after delivery, and the patient feels a painful mass which moves when she turns on her side.

Examination.—The general condition seems fairly good, but patient is apathetic. The abdomen is assymmetrically distended; on the right side there is an elastic fluctuating mass filling the whole lower abdomen. Temperature 101° F., pulse 108. Urine contains a faint trace of albumin and a few hyaline and granular casts.

Laparotomy (twenty-four hours after admission).—Large adherent multilocular cyst on the right side the size of an adult's head; uterus subinvolved; left tube and ovary normal. In delivering the mass it was ruptured, spilling considerable pus in the wound and pelvis. Panhysterectomy with vaginal drainage. Abdomen closed in layers without drainage.

Specimen.—Large multilocular cyst with adhesions and a fibrinous exudate surrounding the loculus which had ruptured in delivery.

Pathological Report.—Infected pseudomucinous multilocular cystadenoma.

The patient did not react well from the operation. In spite of stimulation and subcutaneous saline infusion her condition grew progressively worse. There was repeated vomiting unchecked by lavage. The temperature rose steadily and reached 106.8° F. just before death which occurred about eighteen hours after operation.

Evidently death was due to a combination of shock and sepsis caused by the spread of the virulent cyst contents. Had the correct diagnosis been made early in pregnancy and the cyst been removed at that time, the subsequent catastrophe could easily have been avoided. Such a case as this presents the strongest kind of argument in favor of the operative removal of ovarian tumors early in pregnancy.

The treatment of infected ovarian tumors may be summed up in the two words—prompt operation. When the infected tumor is small and the condition is not to be differentiated from acute inflammatory disease of the adnexa, it will be necessary to carry out conservative nonoperative treatment along the usual lines until evidences of the formation of pus, or of a spreading peritonitis, call for drainage.

There was one death in our series of six cases of infected ovarian cysts—a mortality of 16.6 per cent. While the mortality of a much larger series might prove to be considerably lower, it is nevertheless evident that infection is a very serious complication.

MALIGNANT DEGENERATION.

It is necessary to differentiate sharply between malignant degeneration of a histologically benign growth and primary malignancy; metastases of malignant growths in benign tumors must also be excluded. However, it is a well-established fact that malignant degeneration of benign growths does occur. To quote Pfannenstiel (36) "if large typical cystadenomata contain in their wall carcinomatous masses of younger date, one is justified in the assumption that one is dealing with a cancerous degeneration. This is however not a frequent occurrence; moreover, as a rule one finds carcinomatous characteristics in all portions of the cystic carcinomata, and consequently must assume the presence of primary carcinoma."

In this series there were five cases of malignant degeneration in benign growths; three times there were squamous cell carcinomata developing in dermoid cysts; once a papillary adenocarcinoma developing in a serous cystadenoma; and once an adenocarcinoma developing in a pseudomucinous cystadenoma.

Squamous Cell Carcinoma Developing in Dermoid Cysts.—This occurred three times in the sixty cases of dermoids in the series, *i.e.*, in five per cent. If these figures seem unduly high, it should be borne in mind how frequently dermoids are removed, opened, and thrown away without further microscopic study. *A priori* there is indeed no reason why a carcinoma should not develop from the ectodermal

layer of a dermoid. Viewing the dermoid as a twin inclusion of the host that carries it, why should not the ectoderm of the twin inclusion be at least as apt as the ectoderm of the individual herself to undergo malignant degeneration?

These cases are of sufficient importance to warrant their recital in brief.

CASE I.—Rachel A., aged fifty-eight, service of Dr. Brettauer. Menopause eight years ago; nine pregnancies.

Present Illness.—Began three weeks ago with pain in the lower abdomen and back; has lost considerable weight. One week ago was told she had an abdominal tumor. There is an abdominal mass reaching from the symphysis to the umbilicus, round, tense, cystic, freely movable.

Laparotomy.—Cyst of left ovary with a recent adhesion of the omentum to its upper pole. Oophorectomy. Cyst size of a child's head, its interior filled with thick brown cheesy material; *several hard nodules* the size of tangerine oranges springing from the lower portion of the inner surface of the cyst wall. Microscopic examination of these nodules showed squamous cell carcinoma.

CASE II.—Minnie W., aged fifty, Surg. No. 146732, service of Dr. Brettauer. Menopause six years ago. Two abortions, both at about ten weeks; no other pregnancies. After the second abortion, nineteen years ago; the patient was told she had a tumor. This gave no symptoms except for sterility. The mass appears to have increased in size very little until two years ago, since when the patient thinks it has grown somewhat. It now causes a feeling of weight in the abdomen, pain in the back, and occasional dysuria.

Examination.—Patient is somewhat emaciated. The abdomen is prominent, lax; in the central portion extending from the symphysis to midway between the umbilicus and sternum there is a firm, globular mass, regular in outline, somewhat movable, not tender.

Laparotomy.—Salpingo-oophorectomy. The uterus and opposite ovary atrophic.

Specimen.—Cyst size of adult's head, irregularly lobulated, surface smooth; contents hair and sebaceous material. *At one pole the cyst wall is thickened* and somewhat gelatinous in appearance. On section this portion of the wall shows several small cavities with putty-like content. Microscopic examination of this portion of the cyst wall showed squamous cell carcinoma.

CASE III.—Ella G., aged thirty-five, Surg. No. 146936, service of Dr. Krug. Menstruation regular; profuse for four years. One child. The patient noticed an abdominal mass for two years.

Laparotomy (by Dr. Vineberg).—Considerable bloody ascites. Cyst the size of adult's head; at its upper pole a hard nodular mass the size of a fist, infiltrating the great omentum and a loop of small intestine which were firmly adherent. These adhesions were freed, in part by sharp dissection. Omentum resected. Two feet of small intestine resected, going wide of all visibly involved tissue; side to

side anastomosis. Cyst pedicle ligated and cyst resected. The contents were a milky fluid and a ball of hair. Microscopic examination showed squamous cell carcinoma growing in a dermoid cyst; squamous cell carcinoma penetrating resected intestine and omentum. There were nests of carcinoma cells in the line of mesenteric resection. The patient made a good operative recovery and left the hospital without palpable masses or evidences of ascites. Two months later several hard intraabdominal masses were palpable.

There are not many cases of this interesting condition in the literature. Kruckenberg(37) was one of the earliest to report an ovarian dermoid in whose wall there were islands of normal epithelium showing a transition to alveolar carcinoma with epithelial pearls. There were metastases in the omentum and culdesac of Douglas.

Himmelfarb(38) reported a case in which both ovaries were the seat of dermoids containing hair and sebaceous glands. One cyst consisted in part of an alveolar carcinoma with epithelial pearls; it had perforated into the bladder.

J. G. Clark(39), writing in 1898, states that up to that time only eight cases of carcinoma in dermoid cysts arising from the epidermal layer of the cyst had been reported. He reports a very large tumor part cystic, part solid. The carcinoma had penetrated the wall of the cyst. There was a metastasis in an axillary lymph node.

Shaw(40) describes the case of a large adherent dermoid as follows: "A circular mass of ragged solid growth projects from the external surface of the lower part of the cyst; the growth is pale yellowish white in color and is apparently malignant in character. A section through the growth and cyst wall shows the growth passing through to the inner aspect of the cyst where it forms a flat nodular mass about 2 inches in diameter. . . . Microscopic examination of the growth shows typical squamous cell carcinoma with many cell nests and much cornification of the epithelium. . . . Conclusions: The cyst is a dermoid and the squamous epithelium has undergone malignant change."

Target(40) in discussing Shaw's case mentions a large dermoid containing a carcinoma which had perforated and was adherent.

Further cases of squamous cell carcinoma developing in ovarian dermoids have been reported by Poelzl(41), Ludwig(42) and O. E. A. Franck(43).

Brettauer(44) reported a case of dermoid cyst and adenocarcinoma in the same ovary before this Society in 1907.

Carcinomatous Degeneration of Other Varieties of Cyst.—The history of our case of papillary adenocarcinoma developing in a serous cystadenoma is in brief as follows:

CASE REPORT.—Sarah S., aged forty-five, Surg. No. 113847, service of Dr. Brettauer. Menopause seven years ago. Married twenty-four years, nine children, two abortions. Last child seven years ago. For six months a steady increase in the size of the abdomen; for four weeks a feeling of weight in the abdomen and some pain in the right iliac region. Urination frequent.

Examination.—Showed a large cystic nontender mass occupying the entire lower half of the abdomen; the right side of the mass felt harder than the left; the uterus was not made out.

Laparotomy.—Left salpingo-oophorectomy for a large cyst with long pedicle. The right tube was distended with blood and was resected. Studding the peritoneum of the anterior surface of the broad ligament and the uterovesical pouch there were large numbers of clear, serous, translucent, thin-walled cysts varying in size from pin-point to that of a large pea. A section of the broad ligament was removed for the examination of these. The uterus was normal in size and consistency.

Specimen.—Large irregularly shaped cyst; a constriction in its center gives it the shape and size of two fused grapefruit. Contents a dark brown hemorrhagic fluid. *From one point there projects into the lumen a papilliferous growth the size of a large walnut;* this has not broken through the cyst wall.

Pathological Report.—No evidence of malignancy in the small "metastatic" cysts. The main tumor is a unilocular serous cyst-adenoma in the wall of which papillary adenocarcinoma is developing. The resected right tube contains blood clots; no evidence of an embryo; its mucosa is normal.

Carcinomatous degeneration of pseudomucinous cystadenomata is of rare occurrence. The history of our case is as follows:

CASE REPORT.—Annie D., aged twenty-seven, service of Dr. Krug. Menstruation normal. Married eleven years; one child ten years ago, an abortion four years ago at five months, and one a year ago at six weeks. Ten days ago had an attack of right iliac pain which disappeared under the application of an ice-bag. At that time she first noticed swelling of the abdomen. No other symptoms.

Laparotomy.—Left oophorectomy. A huge cyst with a small pedicle occupying the greater part of the abdominal cavity.

Specimen.—Typical multilocular cyst weighing 9 pounds; contents a thick translucent glairy fluid. At one point on the interior of the cyst wall a *small friable nodule* which looks like carcinoma.

Pathological Report.—Adenocarcinoma growing in the wall of a pseudomucinous cystadenoma.

Diagnosis.—The ages of our five cases of malignant degeneration were respectively, twenty-seven, thirty-five, forty-five, fifty, and fifty-eight. It will be seen, therefore, that while malignant degeneration of ovarian tumors can occur early in life, its tendency in common with malignancy in general, seems to be to develop after the age of thirty-five. In none of the cases were there any symptoms which

could give rise to even a suspicion of malignancy. Indeed, barring the one case in which the carcinoma had penetrated the cyst wall and extended to the omentum and intestine, it was not possible to diagnose the condition even after the abdomen had been opened. It was only after the tumors had been removed and incised that the true state of affairs began to be revealed. It then remained for the microscope to definitely determine the conditions present.

Clinically it will remain impossible to diagnose this condition until such a time as the malignant growth has become far advanced penetrating the capsule of the original tumor and involving adjacent organs, or until distant metastases have occurred and cachexia supervenes; unless, of course, some serological test for carcinoma in general is discovered.

In the light of these cases it becomes imperative to bear this condition in mind in considering the prognosis of ovarian tumors and they furnish an additional powerful argument, if such be needed, for the early removal of every ovarian tumor.

Sarcomatous Degeneration.—Before leaving this subject it will be well to mention that the development of sarcoma in benign ovarian tumors has also been noted. Sarcomatous degeneration has been reported not only in connective-tissue tumors, but also in tumors of epithelial origin.

H. J. Hartz(45) reports a solid tumor of the ovary weighing $13\frac{1}{4}$ pounds removed from a woman of fifty-six. "Sections of the tumor show it to possess the usual structure of a fibromyoma for the most part; at points there are small areas of lime salts and the connective tissue has undergone extensive hyaline change. In certain areas cells are numerous and are oval or round shaped; they are closely placed, have prominent nuclei, and some masses contain thin-walled blood-vessels. Pathological diagnosis: Fibromyoma showing hyaline degeneration, calcareous infiltration, and sarcomatous transformation."

He cites two cases of sarcomatous degeneration of fibromyoma of the ovary reported previous to his by Wolff(46) and Bushnell(47).

Goldschmitt(48) reported a case of spindle cell sarcoma developing in the wall of a papillary parovarian cyst. There was a cystic tumor the size of a child's head; at its upper pole there was a solid growth the size of a mandarin orange. This was a spindle cell sarcoma growing in a typical papillary cystadenoma.

A remarkable case of sarcoma developing in a multilocular papillary cystadenoma is reported by Cullen(49). For a very complete description the reader is referred to the original paper.

PREGNANCY.

There were eleven operations for ovarian tumor complicated by pregnancy. In only two of these was the operative interference followed by uterine contractions of sufficient strength to discharge the products of conception. In the remaining nine cases pregnancy continued uninterrupted. The essential facts of the cases may be gathered from the subjoined table.

All but one of the cysts were removed by laparotomy. This was a dermoid the size of an orange removed by vaginal celiotomy, in the seventh month of pregnancy. Of nine cases operated before the sixth month of pregnancy one aborted eleven days after operation. This was a salpingo-oophorectomy for serous cystadenoma done in the sixth week of gestation; it is of interest to note that the wall of the cyst contained the corpus luteum of pregnancy. Of the two cases operated after the sixth month of gestation, one resulted in a premature labor with living child thirty-six hours after operation. This was a large simple cyst with twisted pedicle; the history is of sufficient interest to warrant a brief summary.

CASE REPORT.—Margaret E., aged twenty-eight, Surg. No. 144623, Service of Dr. Krug. This is the patient's second pregnancy. The first resulted in an abortion. She is now eight months pregnant. There was considerable vomiting in the early months; she has felt perfectly well for the past two months.

Present Illness.—Began suddenly three days ago with pain referred to the left hypochondrium. This was soon followed by repeated vomiting which has persisted.

Examination.—Shows the uterus enlarged to the size of an eight months' pregnancy. To the left of the uterus is a mass about 6 inches in diameter, rather firm, tender, and movable. Temperature 100.4° F., pulse 100. Operation two hours after admission by Dr. Vineberg; left rectus-splitting incision; an ovarian cyst found in the left lower abdomen, flattened out against the uterus; the cyst was deep purple in color, its pedicle being twisted two complete turns. Oophorectomy. Abdomen closed in layers; four extraperitoneal through-and-through tension sutures of silkworm-gut, chromic catgut sutures for the peritoneum and muscle, interrupted chromic sutures for the fascia, linen for the skin.

Thirty-six hours after operation the patient delivered herself of a live child after a short easy labor. The wound healed per primam; no hernia resulted.

Of special interest are two cases in one of which the only corpus luteum present was removed, and in the other the sole remaining ovary was removed, yet neither resulted in an abortion.

TABLE I.

Tumor	Age	Para	Period of gestation	Operation	Complications of tumor	Abortion	Remarks
1 Serous cystadenoma	23	2	3 months	Salpingo-oophorectomy	.....	No	Cyst size of large orange in culdesac.
2 Dermoid	29	1	7 months	Postvaginal salpingo-oophorectomy	.....	No	Cyst size of orange: ruptured in delivery; gauze drainage for vascularity and oozing.
3 Serous cystadenoma	21	1	7 weeks	Myomectomy, salpingo-oophorectomy	.....	No	Cyst size of mandarin orange; fibroid nodule size of marble on posterior surface of fundus shelled out; gap sutured.
4 Serous cystadenoma	36	7	6 weeks	Salpingo-oophorectomy	.....	11 days post-operative	Cyst 5 X 7 inches; corpus luteum of pregnancy in wall of cyst.
5 Serous cystadenoma	32	3	5½ months	Resection of cyst. Stump of ovary sutured	.....	No	Cyst size of orange deep in pelvis.
6 Dermoid	35	5	3½ months	Oophorectomy.	.....	No	
7 Papillary serous cystadenoma	21	1	3 months	Cyst shelled out of ovary	.....	No	Cyst size of child's head. Rest of ovary normal. Large corpus luteum in opposite ovary.
8 Serous cystadenoma	24	1	4 months	Oophorectomy	.....	No	
9 Corpus luteum cyst.	19	1	2 months	Oophorectomy	.....	No	Cyst size of lemon. No corpus luteum in opposite ovary.
10 Serous cystadenoma	32	6	2 months	Left oophorectomy	.....	No	Cyst of grapefruit. Corpus luteum cyst on its inner side. 9 years ago <i>right oophorectomy</i> for cyst; abortion on tenth day post-operative.
11 Serous cystadenoma	28	2	8 months	Oophorectomy	Pedicle twisted X 2	36 hr. post-operative; premature labor; live child	8-inch cyst deep purple in color in left abdomen flattened out against uterus.

CASE REPORT.—Fannie G., aged nineteen, Surg. No. 142899, service of Dr. Brettauer. Married one year; aborted seven months ago at the third month of pregnancy. For the past year she has had more or less cramp-like pain in the lower abdomen; this occasionally radiates to the back and is worse at the menstrual periods. Last menstruation two months ago; there is morning vomiting.

Bimanual examination shows a soft cervix pointing toward the symphysis. In the posterior culdesac a mass the size of an orange pressing on the rectum; to the left and anterior another elastic mass the size of a lemon. On manipulation the posterior mass is easily lifted out of the pelvis and proves to be a pregnant uterus. The smaller mass appears to be an ovarian cyst.

Laparotomy.—Left ovarian cyst resected. Uterus gravid about eight weeks. Right adnexa normal; *no corpus luteum in the right ovary.*

Specimen.—Corpus luteum cyst. The only corpus luteum present was therefore removed, nevertheless the patient did not abort. Seven weeks postoperative she was reexamined and the uterus was found the size of a four months' pregnancy.

CASE REPORT.—Amelia G., aged thirty-two, Surg. No. 115562, service of Dr. Krug. Nine years ago, the patient had a right oophorectomy for ovarian cyst; this was followed by a miscarriage on the tenth day after operation.

Married thirteen years; four children, two abortions. Menstruation regular, last period two months ago. For one year dull aching pain on the left side; gradually backache developed and is now constant. For the past two months the pain is more severe and is accompanied by nausea with occasional vomiting. Lately the nausea has been constant and the patient is on a forced diet.

Laparotomy.—Uterus enlarged to size of two months' pregnancy, soft and vascular. Left ovary converted into a mass the size of a grapefruit; there is some solid ovarian substance, two smaller cysts, and a corpus luteum cyst on the inner side of the tumor mass. Total oophorectomy. On the right side there is a scar of the former operation at the site of the ovary.

Pathological Report.—Serous cystadenoma with corpus luteum cyst.

The patient did not abort while in the hospital, though she had occasional bearing-down pain.

The routine postoperative treatment of our cases was along the lines of that for threatened abortion. The patients were kept absolutely quiet on their backs, strong cathartics were avoided, and opium was administered by mouth or per rectum for several days following operation.

While this series of eleven cases is much too small to warrant any sweeping deductions, taken in conjunction with the literature of the subject, they justify the formation of certain conclusions as to

whether or no it is proper and justifiable to operate upon ovarian tumors during pregnancy.

Bearing in mind the broad general rule that the safety of the mother is our first consideration and that the welfare of the fetus is secondary, it may be stated that whenever an ovarian tumor gives rise to marked symptoms, or whenever by its size or location it threatens to add seriously to the dangers and difficulties of parturition, it is justifiable to remove it by operation regardless of the period of gestation. There may be isolated instances in which it is justifiable to await the end of pregnancy and combine the oophorectomy with delivery of the child by Cesarean section. This is an obstetrical problem which is outside the scope of this paper. Yet it in no sense militates against the general rule laid down.

The dangers of a laparotomy wound inflicted in the later months of pregnancy have been much exaggerated. If the operation is followed within a few days by premature labor, a carefully made layer suture of the abdominal wall reinforced by through-and-through sutures of nonabsorbable material should withstand the strain of labor. This is proved by one of our cases (Case 11 of the table). On the other hand, if labor does not come on until complete wound healing has occurred, the chances of not having a hernia develop are, to say the least, very fair. It seems to the writer that even the development of a ventral hernia is a small price to pay for the avoidance of the grave complications liable to occur with an ovarian tumor which by its size or location threatens to interfere seriously with labor.

In the earlier months of pregnancy we have only a possible abortion to weigh in the balance against the real dangers to the mother's life. This would seem to occur in only 20 per cent. of the cases operated upon during the earlier months, a proportion not much, if any, larger than those in which the presence of the cyst itself would eventually lead to an abortion if it were left *in situ*. After a study of this subject Norris(50) draws a far more sweeping conclusion. He says "the expectant treatment of an ovarian tumor discovered during pregnancy carries a danger to the mother three times as great as that of early operation. If operative interference occurs prior to the fifth month of pregnancy, the chances of saving the fetus are three times as great as those of expectant treatment. If operation is delayed until after the middle of pregnancy, the proportion of interrupted pregnancies is much increased and is about the same as that of expectant treatment."

He quotes Cathola(50) who reports eleven operations during pregnancy with two miscarriages—figures identical with ours.

Our cases of removal of the corpus luteum of pregnancy, and removal of the sole remaining ovary, without induction of abortion are by no means unique in the literature. Thus Lowenstein(51) reported a case in which one ovary was removed for a dermoid. The patient subsequently became pregnant and in her third month the other ovary, which was much enlarged and showed cystic degeneration, was removed because of the severe pain it caused. The patient went on to full term and gave birth to an 8-pound healthy child which she was able to nurse for sixteen months. He felt certain that all ovarian tissue was removed because menstruation never returned. These cases go far to disprove the theory that the corpus luteum or even the ovary is essential for the development of the ovum, once it has found its nidation in the uterus. If internal secretions be necessary for such development they must be evolved in organs other than the ovary. Of course, the remote possibility of the presence of a supernumerary ovary must be taken into consideration, and this could naturally not be ruled out without a careful complete autopsy. Yet the clinical evidence is sufficiently strong to warrant the belief that the development of the ovum within the uterus can continue, once it has begun, without the presence of ovarian tissue.

Lowenstein quotes Strassman to the effect that "ovarian function is at a standstill during pregnancy, and the emptied ovum container—corpus luteum verum—has absolutely no significance for the development of the uterus (Fruchthalter)." He claimed that what Strassman believes as a result of anatomical and physiological studies is proved by clinical observations.

Lowenstein also quotes Fraenkel who claims that the influence of the corpus luteum upon the ovum ceases after the seventh to eighth week, and that therefore ovarian tumors should not be operated before that date. (A contention which would seem to be upheld by Case IV of our series, where the removal of the corpus luteum of pregnancy at six weeks was followed by abortion.) However, Lowenstein claims that this dictum has been disproved by the fact that the operative removal of the corpus luteum in the very earliest weeks of pregnancy has proved compatible with its continuation.

ASCITES.

Small quantities of free fluid caused by rupture or perforation of a cyst with extravasation of cyst contents, or by rupture of a small blood-vessel with intraperitoneal hemorrhage, are not included under this heading. Including under the term "ascites" only the presence

of considerable transudate in the peritoneal cavity, there were twenty-one cases in the series. Eleven times ascites (mostly blood tinged) was found with carcinomata; once with an uncomplicated papillary cystadenoma; five times with tumors with twisted pedicle (one fibrosarcoma, two papillary cystadenomata, one simple cystadenoma, one multilocular pseudomucinous cystadenoma); once with an infected dermoid cyst; and three times with simple uncomplicated fibromata.

As ascites is the rule rather than the exception in all forms of intra-peritoneal carcinoma, it is not surprising to find it with carcinoma of the ovaries. Papillary cystadenoma probably gives rise to serous transudate into the peritoneal cavity by chemical irritation in a manner closely analogous to that of carcinoma. In tumors with twisted pedicles, the interference with the circulation and consequent lack of nutrition or even necrosis of the surface epithelial cells, causes the growth to assume the nature of a foreign body in the peritoneal cavity, and the outpouring of ascitic fluid can readily be explained by the mechanical irritation involved. That ascites can occur in the presence of infection requires no further comment.

It has long been known that ascites occurs very frequently with uncomplicated ovarian fibromata. In this series it was present in three out of four cases. Just why this should be is not as yet understood. Removal of the fibroma is promptly followed by the disappearance of the ascites.

MISCELLANEOUS COMPLICATIONS.

For the sake of completeness it will be well to mention the incidental pathologic pelvic conditions encountered in these cases. They were

Uterine fibroids.....	4 cases
Chronic metritis or "fibrosis uteri".....	3 cases
Retroflexion.....	2 cases
Hydrosalpinx.....	5 cases
Gonorrheal salpingitis (chronic).....	4 cases
Pyosalpinx.....	2 cases
Incomplete abortion.....	1 case
Ectopic gestation.....	2 cases

In general it may be stated that with acute pelvic conditions complicating ovarian tumors, the predominating symptoms will be those of the acute condition, while the more noticeable physical signs will be those of the tumor. The clinical history is that of the acute condition; upon examination the presence of the ovarian tumor is apt to obscure all else and dominate the picture. This is especially the case

if the tumor be at all large. Thus both the cases of ectopic gestation were early and as yet unruptured. In both there was a fairly characteristic history of extrauterine gestation; although neither case had skipped a menstrual period, the metrorrhagia coming on before the time of the next regular period. In both of the cases the ovarian tumor was distinctly palpable, and in neither was the extrauterine pregnancy even suspected.

POSTOPERATIVE COMPLICATIONS AND MORTALITY.

Finally there remain to be considered the complications occurring during convalescence from operation, as well as the mortality ensuing. The postoperative complications we encountered were as follows:

Hematoma of abdominal wall.....	1 case
Stitch abscess of abdominal wall.....	1 case
Bursting open of entire abdominal wound.....	1 case
Stump exudate.....	2 cases
Pelvic abscess.....	2 cases
Pelvic hematoma.....	1 case
Secondary intraperitoneal hemorrhage.....	1 case
Thrombophlebitis.....	2 cases
Postoperative pneumonia.....	2 cases
Deaths.....	3 cases

Stitch Abscess and Hematoma of Abdominal Wall.—These require no further comment. Careful hemostasis and strict asepsis will reduce such occurrences to a minimum.

Bursting Open of the Entire Wound.—This occurred after an easy bilateral salpingo-oophorectomy. The median incision was closed by layer suture, the peritoneum being closed by continuous suture of catgut, the fascia and skin by interrupted silk sutures. Six days after operation the pulse suddenly rose to 104 and there was a bloody discharge through the binder. Upon removal of the dressing, the entire wound was found reopened; there had apparently been no attempt at healing; in the upper angle of the wound the omentum and in the lower part two loops of small intestine, were visible. These were forced back as much as feasible with iodoform gauze packing, and the wound was strapped with adhesive plaster. There was no subsequent rise of temperature and the wound slowly healed by granulation. The patient left the hospital two months later with the wound entirely healed and a moderate diastasis recti.

It is difficult to account for the entire lack of a healing tend-

ency in such cases. When this accident occurs in a cachectic patient the subject of malignant disease, whose nutrition is at a low ebb, one can more readily understand the lack of reparative power in the tissues. Possibly the condition is due to a chemical disturbance in the blood.

As regards prophylaxis, it has always seemed to the writer that an incision in the exact median line is much inferior to one placed just to one side of it, with blunt separation of the rectus muscle fibers. This permits of the suture of the abdominal wall in *four* layers and interposes a strong bulwark of muscle tissue in the line of the scar.

As to whether to pursue the course that was taken in this case, allowing the wound that has burst open to heal from the bottom, or to immediately resuture it, is too large a question to enter into here. I can recall three cases in which laparotomy wounds which had burst open were immediately resutured, primary union resulting from this secondary suture with no subsequent formation of a hernia. The course to pursue in any given case will depend upon the individual judgment of the surgeon, and should be governed largely by the degree of prolapse and contamination of viscera which has occurred.

Stump Exudate.—This occurred twice after removal of infected cysts. The cases are recounted more at length under the heading "Infection." Both cases were treated by hot air baking and cleared up rapidly. There can be no question that this form of treatment exerts a most favorable influence upon the absorption of solid inflammatory exudates in the pelvis.

Pelvic Abscess.—This occurred once after a vaginal salpingo-oophorectomy for simple cyst. The wound was closed without drainage. There was a febrile convalescence and a small mass developed. Reopening of the vaginal wound and evacuation of an ounce of pus, with gauze drainage, was followed by rapid healing.

In the second case an abdominal supravaginal hysterectomy with bilateral salpingo-oophorectomy was done for bilateral intraligamentous cysts. Vaginal gauze drainage behind the stump of the cervix was instituted. After the removal of the gauze fever developed; the reopening of the postvaginal wound and evacuation of a moderate amount of foul-smelling serosanguinolent fluid was followed by prompt convalescence.

Pelvic Hematoma.—This case was a salpingo-oophorectomy for dermoid cyst, the pedicle being ligated with silk. A small cyst in the opposite ovary (right side) was excised and the wound in the

ovary sutured with fine catgut. The patient went home apparently well, but returned six weeks after operation complaining of constant abdominal pain, and a severe dysmenorrhea. Examination showed the left side free and clear; the uterus was slightly fixed; to the right of the uterus was a smooth elastic mass the size of an orange. No fever. A postvaginal section was done and numerous old blood clots were evacuated; the cavity² was drained with gauze. Patient went home well in eight days—evidently a secondary hemorrhage from the partially resected ovary.

Secondary Intraoperative Hemorrhage.—This was a case of salpingo-oophorectomy for a simple cyst buried in firm intestinal adhesions. The cyst was freed from the adhesions and resected, its pedicle being ligated with No. 3 iodine catgut. After operation the patient gradually developed symptoms of internal hemorrhage. Within fifteen hours of the closure of the wound these had become classic, marked pallor, slight dyspnea, pulse 130, respirations 32, movable dullness in the flanks. On secondary laparotomy, there was about a quart of free blood in the peritoneal cavity; a small rent was found in the upper border of the broad ligament close to the stump of the cyst pedicle; this rent was oozing freely and was sutured. Further convalescence uneventful. In tying off the pedicle, too much tension had evidently been made upon the broad ligament.

Thrombophlebitis.—In one case this followed a salpingo-oophorectomy for dermoid cyst. The inflamed omentum was adherent to the cyst and was resected. A typical left saphenous and femoral phlebitis developed on the tenth day postoperative, and lasted three weeks. There was only slight edema and the highest temperature was 101.4° F.

In the second case a phlebitis developed in both saphenous veins following a salpingo-oophorectomy for simple cyst. The process was afebrile and of a mild degree, the patient being able to go home six weeks after operation.

Pneumonia.—In the first case pneumonia developed twenty-four hours after an easy salpingo-oophorectomy for multilocular cyst; uneventful gas and other anesthesia. The signs of consolidation were well marked; the temperature ranged around 103° F. and reached normal in five days.

In the second case a left salpingo-oophorectomy, right salpingectomy, and appendectomy were done for bilateral purulent salpingitis, simple ovarian cyst, and chronic appendicitis. The tubes and the appendix were buried in dense adhesions. Post-

vaginal gauze drainage was employed to control oozing from raw areas in the pelvis. The patient took a fairly good gas and ether anesthesia. Three days later a pneumonia developed; the highest temperature was 103.4° F. Temperature reached normal four days after onset of pneumonia.

While there is a tendency to term these postoperative pneumonias "ether pneumonias" and blame them upon an unskilful or unsatisfactory anesthesia, it is more likely that they are embolic in nature. Their brief duration and atypical course would point to this conclusion. It is worthy of note that after certain operations in which veins emptying directly into the return circulation are disturbed (resection of omentum, umbilical hernia), postoperative pneumonias are particularly frequent. Moreover, as is well known, typical postoperative pneumonia can occur after operations done under local anesthesia.

Generally speaking the prognosis is good, and unless the pneumonia be part of a generalized septic process, the vast majority of postoperative pneumonias recover.

Deaths.—There were three deaths following these 240 operations. These figures refer solely to the immediate postoperative mortality. They do not refer to the subsequent fate of the patients after leaving the hospital. Doubtless a considerable number of the cases of malignant disease succumbed within a few months of their return to their homes.

Of the three postoperative deaths two occurred in cases of carcinoma. One patient died of asthenia six days after a simple exploratory laparotomy for large carcinoma of the ovaries with multiple metastases. In the second case a panhysterectomy was done for papillary carcinomata of both ovaries. The tumors formed large masses filling the entire pelvis, and reaching almost up to the level of the umbilicus. There were dense adhesions. The patient died of shock nine hours after operation.

The third death occurred in the case of infected pseudomucinous cyst operated on the seventeenth day postpartum. This patient died less than twenty-four hours after operation of a combination of shock and sepsis. The history has been recounted more in detail under the heading "Infection" (*vide supra*). The total mortality then was 1.25 per cent. Excluding the deaths of the two advanced cancer cases, the mortality was 0.41 per cent. The mortality of the uncomplicated cases was nil.

The operative treatment of ovarian tumors needs no champion at this late date. However, the writer would be well pleased if the

data which have been enumerated in this paper would serve to emphasize anew the urgency of the *early* removal of all ovarian neoplasms.

In conclusion it is a pleasant duty to express my thanks to Drs. Brettauer and Krug for their courtesy in permitting me the use of the material of their respective services as a basis for this study.

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67 WEST EIGHTY-NINTH STREET.

PELVIC VARICOCELE.*

BY

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THE chief symptom complained of by many women seeking advice for the so-called female troubles is a persistent, dull aching pain in the left iliac region. This pain which at times is barely noticeable, at other times very severe, is in many instances relieved by the recumbent position, is aggravated by standing or walking, and is usually worse at or during the menstrual period. This symptom is frequently unassociated with palpable intrapelvic lesion, except, perhaps, a slightly enlarged ovary or a retrodisplaced uterus. In the parous woman there may be tears of the cervix or the pelvic floor. Women who have uterine displacements or lacerations undergo the usual operations for these conditions and many are ultimately re-

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lieved, but some are not. Women presenting no palpable lesion except slightly enlarged ovaries are often told that they have chronic ovariitis or that there is absolutely nothing the matter; that the pains are due to their neurotic condition. That there is always a good reason for physical suffering, is a fact too frequently overlooked.

The following case suggested to the writer a cause which might give rise to this symptom.

In 1910, Mrs. A.; para-ii; aged thirty-two years; was admitted to the Woman's Hospital, complaining of a dull aching pain in the iliac region which was worse after a day's work and at the time of menstruation, and which had persisted ever since the birth of her last baby, three years before. Most of the time it was localized, but occasionally it radiated down the anterior aspect of her left thigh. Her physician told her that she had inflammation of the left ovary and laceration.

Menstruation was regular, of the twenty-eight-day type, and lasted from three to four days. Constipation had existed ever since girlhood.

Examination showed laceration of the cervix and perineum. The uterus was in the anterior position. The left ovary was enlarged to about the dimensions of a good-sized olive. Some pain was elicited on deep pressure on the left side, but not on pressure over the caput coli.

After repair of the torn cervix and perineum, the patient was placed in the extreme Trendelenburg position, the abdomen opened by a low transverse incision, and the pelvis explored; but no evidences of pelvic inflammation were found. Both ovaries were cystic, and the left was about one-third larger than the right. The appendix was free from adhesion, soft, and apparently normal. In the left broad ligament, there was a marked venous engorgement of the pampiniform plexus which, in spite of the inverted position of the patient, did not disappear. No other lesion was found in the abdomen. While debating whether or not the left ovary should be resected, it was decided to double ligate the ovarian vein of the left pampiniform plexus. Owing to the rather unsatisfactory result obtained in the past from resection of cystic ovaries, it was deemed wise not to molest this organ.

The patient made a good recovery and left the hospital two weeks later, relieved of pain. Four months later, she reported that her distress had been entirely relieved. It should be said in this connection that under instructions she had taken great pains to keep her bowels free.

The presence in this case of these permanently dilated veins of the left, occasionally of the right, pampiniform plexus demonstrated to the writer a distinct pathological entity, capable of giving rise to the persistent pain of which the patient complained.

This condition of varicosity, which has been termed pelvic

varicosity, has long been recognized but has been very little discussed. The literature on the subject is very meager. Emmett, in 1878, in "Principles and Practice of Gynecology," mentions the existence of pelvic varicosities under the title of uteroovarian varicocele. He says: "After repeated pregnancies, or from any cause where the venous circulation has been obstructed, the vessels become varicosed." Once in a while a case or two is reported in which a pelvic varicosity is mentioned as the principal lesion. Palmer Dudley reported four cases in 1895. At the meeting of the A. M. A. in Atlantic City, June, 1914, Darnell reported six cases. In the discussion of his paper, several of the doctors reported having seen this condition. Most of the modern text-books mention the existence of pelvic varicosities, but lay no stress on their symptom-producing significance. The writer doubts if there is a single gynecologist of any experience who has not seen and recognized this condition. Therefore, it is necessary only to emphasize its importance as a factor in the production of this common gynecological complaint.

That the veins of the pampiniform plexus are most commonly affected, on account of their location, poor structural support, and lack of valves, is well known. Hence, the term pelvic varicocele is used to designate varicosity of these plexuses.

Every gynecologist will acknowledge that chronic pelvic pain is most frequently found on the left side. Herman states that in 75 per cent. of the cases of retrodisplacement the pain is referred to the left side. Novak states that in cancer of the uterus, pain is referred to the left side in about 81 per cent. of the cases. In a series of 2000 cases in one of the clinics of the New York Post-Graduate Hospital, 1450 located the pain on the left side. This localization has been explained in various ways, some of which seem hardly credible. Herman says that the reason is to be found in the fact that the left side is weaker than the right, not only in muscular strength but in power of resistance to painful impression. In Clarke's opinion, it is due to strong tension of the mesentery over the brim of the pelvis. Many writers attribute the cause to the anatomical arrangement of the organs on the left side—the presence of the sigmoid with its mesentery encroaching upon the attachment of the broad ligament to the brim—and the backward course of the left ovarian vein to the renal vein. This last explanation seems to be the most rational, easily accounting for the morbid conditions to which it is the object of this paper to call attention.

On the left side, the ovarian vein, the principal drainage canal of

the outer part of the broad ligament, after leaving the infundibulopelvic ligament, runs inward and upward behind the mesentery of the sigmoid and descending colon to the renal vein, which it enters at right angles. It has at best only two valves, one at its exit from the plexus, and one as it enters the renal vein. Sometimes one or both valves are missing. It is easily seen, therefore, that interference from above with the free passage of blood, or the lack of propulsive power from-below, must tend to produce venous engorgement. This interference and lack of power have much less force on the right side, because here the ovarian vein runs from the infundibulopelvic ligament at an acute angle over a short distance to the inferior vena cava.

The child-bearing woman is the most frequent sufferer from this condition. During pregnancy the return flow of blood from the pelvis may be interfered with by the weight of the uterus, tight clothing, constipation, etc. Constitutional disease, debility, anemia, etc., may hinder the proper involution of the veins after delivery. Traumata following a severe prolonged labor, the use of forceps, and unskillful delivery often induce subinvolution. Lacerations of the parturient canal destroy to a more or less extent the integrity of the vascular support and diminish the propulsive force necessary for the proper function of the veins. Retroflexion of the uterus, which is usually the result of subinvolution, tends to slow the venous stream. Relaxation of the uterine supports, inducing a descensus after a prolonged second stage of labor is, in the opinion of the writer, a very common cause of venous stasis.

Apart from the results following child-bearing, the conditions favoring varicocele are increased abdominal pressure from constrictions of the upper abdomen, by tight corsets, bands, etc., abdominal ptoses, new-growths (tumors, etc.), inflammatory processes, adhesions, constipation, and extensive hyperemias, such as are caused by overindulgence in coitus, constant and unsatisfied sexual desire, and masturbation, which so flood the venous exits as to induce passive congestion.

In the writer's experience, the most frequent causes, especially in the young woman or nullipara are a sigmoid adherent to the outer third of the broad ligament and constipation, either a complete failure to empty the bowel at proper intervals, or only partial evacuation. In a great many instances, where the lower bowel has been emptied, the upper part of the sigmoid or the descending colon may remain full for days or weeks. The mechanical pressure exerted by a constantly distended bowel must necessarily tend to

obstruct the flow in the ovarian vein and produce dilation of the venous plexus of the broad ligament. Blair Bell says that the overlaid sigmoid may obstruct the circulation through the left ovarian vein, with the result that varicocele is found on that side. These pains (left sided) are due to constipation—whether chronic constipation, varicocele, or infection through the bowel wall. There is no doubt that many women could be relieved of their left-sided pains if the simple operation of ligation of the varicocele were more frequently performed. In youth and adult life, where health and vital forces are above par, nature, in her wonderful supervision, is able to overcome such obstacles if the opposing forces are not too long applied. If, however, the stress continues beyond the sustaining point, or the vital forces have been weakened by debility, child-bearing, or disease, the result is a compensatory dilation of the venous plexuses, which is designated as a varicosity.

No one will deny that varicose veins cause pain, and a pain that is very characteristic in that it is a dull ache of a very annoying persistence at times, while at other times it is sharp, shooting, or neuralgic. R. Schmidt, in his work on "Pain" (p. 349), says that "closure or obstruction of veins as well as of the arteries, may give rise to severe pain."

Pain of this kind is usually made light of by most women for a long time, for two reasons: first, because, as a rule, it comes on slowly and for a while is not unbearable, and tradition teaches that there is always some pelvic pain of a negligible character following child-bearing; and, second, most women believe that there is a good physiological reason for mild pain during the menstrual life or that, in some way, the normal ovary in performing its functions is to blame; and, too frequently, her ideas are seconded by her physician. When the suffering becomes too constant or too severe, the patient consults her doctor, and, oftentimes discovering for the first time that she has pathological conditions of which she was completely ignorant, readily consents to treatment or operation. It is not uncommon to find that a great many women, after the usual gynecological operations, continue to complain of the same old chronic pain which existed before going to the hospital, and it is very difficult to persuade these women that everything had been done for the best.

The writer believes that if pelvic varicosities were given more importance in the diagnosis of these cases, there would rarely be a case which would not give full credit to the surgical procedures. The diagnosis of pelvic varicocele must usually be made by elimination.

Sometimes it may be felt as a fulness in the outer portion of the broad ligament on bimanual examination, after elimination of the intestines and omentum. This fulness is easily compressible but is without form, and resumes its bulk after the pressure has been removed. There is only a slight degree of pain elicited by the pressure. There is never an acute sensitiveness or any transmitted pain. In the presence of adhesions or agglutinated organs, the mass felt is very appreciable and less easily compressed. This appreciation, of course, is possible only when the abdominal wall is thin or very relaxed. It might be said that the combination of a dull, persistent, aching pain, as described above, with the absence of any gross lesions, is pretty good evidence of the existence of varicocele.

In making the elimination of conditions other than gross lesions, the writer believes that great caution should be exercised in attributing the origin of the symptoms to the ovary, for he does not believe that the so-called chronic ovaritis, or sclerotic ovary, ever gives rise to pain of such a description. The pathology of such an ovary is against such a possibility. Also, as this pain is usually one sided, and as there is rarely much difference in the size of the ovaries, it is difficult to explain why one should offend and not the other. But tradition teaches, wrongly as the writer believes, that these ovaries are offenders, and many an ovary has been partially or wholly sacrificed for that reason, and generally without relief of the symptoms. The history of the following case is interesting in view of this statement.

A young woman, twenty years of age, unmarried and a virgin, full blooded and well developed, appeared for relief from a persistent pain in the left iliac region, more or less constant, and extremely severe at the time of menstruation. She had always worn "well-fitting" corsets, and was constipated. She was somewhat anemic. She had had various tonic treatments, without relief. There was no leucorrhœal discharge. Bimanual palpation per rectum revealed a uterus slightly anteflexed; both ovaries cystic, left more than the right; tubes not felt. Palpation caused some pain on the left side. She was curetted, with temporary relief, and a few months later she had a laparotomy, and both ovaries were resected. This was followed by a few months of relief. The suffering returned, however, in a more aggravated form. She then consented to oophorectomy. On opening the abdomen, attention was directed to the marked varicocele of the left pampiniform plexus. Double ligation of the varicocele was performed, and the ovaries were left untouched. The patient had had almost complete relief for four years.

Ovarian cystoma and hyperemia of the ovary are easily recognized, the latter by the fact that such an ovary is very sensitive to touch and is entirely cured by a few days in bed.

The writer does not wish to be understood as claiming that every dull chronic pain in the left iliac region or that every case presenting the characteristic pain of a passive congestion is due to a varicocele. Recognizing that a varicosity, being a permanent dilatation, is the end result of a continued passive condition, the element of duration is a factor of paramount importance. Nature is able, for a long time, to preserve enough recuperative power to induce satisfactory involution of dilated veins. During this period, if the exciting cause is removed, the patient is relieved. Just what that length of time is, depends on the personal equation of each patient. In the child-bearing woman, there is more likelihood of cure by simple repair of lacerations or correction of descensus or of retrodisplacements, because, as a rule, the patient's attention is early directed to the results of labor on account of the sequence of suffering. It is the young or nulliparous woman with whom the greatest care should be exercised. Darnell says rightly that "by reason of a failure to find anything tangible, the woman is often assured that there is absolutely nothing the matter and is, in the mind of her doctor, consigned to that large class of neurotics with magnified imaginary symptoms which center in the pelvis."

Medical treatment of this condition is only palliative. The use of tampons and pessaries, or rest in bed with the foot slightly elevated, sometimes gives relief for the time being. As in male varicocele, the only permanent cure is obtained by surgical means before or after the cause has been eliminated. The abdomen should be opened and the varicosities double ligated, and either excised or simply divided. Double ligation alone is efficacious, but there is the chance of the reestablishment of continuity, which is absolutely prevented by excision or division.

Where there is doubt as to the exact diagnosis, an exploratory operation is justified. It is almost an axiom of modern surgery that when the evidences of a lesion, gained by a study of the symptoms and examination, are not sufficient, an exploratory operation is demanded.

The best arguments for any contention are results, and the writer herewith reports the following six cases of pelvic varicocele, operated on by him.

CASE I.—Mrs. F. B.; para-i; aged twenty-one; entered the Post-Graduate Hospital July 31, 1913. She was married at twelve; had

one child, a year ago; normal labor. Since then menstruation has been irregular—four to six weeks—and accompanied with severe pain. In the past four months, she has complained of a dull persistent pain in the left iliac region, which pain was sometimes worse at night. She has more or less leukorrhea, and is very constipated. Diagnosis on admission—laceration of the perineum and chronic inflammation of the left tube and ovary. At operation, after the abdomen was opened, no evidence of pelvic inflammation was found. Both ovaries were cystic, the left being the size of a horse-chestnut. The left pampiniform plexus was markedly varicose. Even in the extreme Trendelenburg position, these veins were very prominent. Double ligation and division of the varicocele was performed, and the appendix was removed—a routine procedure. The perineum had been repaired before the laparotomy. Six months later the patient reported that the left-sided pain had ceased.

CASE II.—Mrs. E. H.; aged twenty-seven; para-i; entered the Woman's Hospital December 4, 1913. Two years ago she was operated upon for retroversion, lacerated cervix and perineum, for the relief of backache and left-sided iliac pain, but there was not much relief from these operations. She complains now of pain in both iliac regions. Douching produces "pain in the womb." Menstruation is regular and the bowels move every day. Examination shows a full sigmoid, uterus in position. Deep pressure over the caput coli causes pain. The left ovary is enlarged to the size of a large olive. Results of the repair of the cervix and perineum, good.

Operation.—On opening the abdomen, there was seen a marked varicosity of the left broad ligament, but no other pathological condition. The bowels having been cleansed by a high colonic irrigation, the large bowel was empty. Double ligation of the left pampiniform plexus was performed. The patient was watched for three months, at the end of which time the left-sided pain had disappeared, although she still complained of pain over the caput coli, and of backache.

CASE III.—Mrs. A. S.; aged forty-one; para-ii; entered the Woman's Hospital December 20, 1913. She complained of dull aching pain in both iliac regions and over the sacrum, which had persisted for one year. She had moderate leukorrhea. Dispensary treatment for some time gave temporary relief. She entered the hospital with a diagnosis of enlarged ovaries. She always had to take medicine for her bowels. Examination showed the uterus somewhat enlarged and low in the pelvis; both ovaries the size of large pecan nuts; all pelvic organs freely movable; some pain on deep pressure over the caput coli.

On operation, the uterus was found rather low in the pelvis; both ovaries enlarged and cystic; both pampiniform plexuses varicose. Ventral suspension and double ligation of the right varicocele, and excision of the left, performed. Three months afterward the patient reported that she was entirely relieved of pain.

CASE IV.—Mrs. V. L.; aged thirty-six; para-iv; menses regular—

four days in duration. Has suffered from chronic pain in right side, which at times is very severe. This pain has been so constant and irritating that she always wanted to scratch the deep iliac region. She has not been free from pain since the birth of her first baby, eight years ago. She was curetted four years ago. She had an abdominal operation twelve years ago for "abscess of left ovary." In 1912, she was operated upon for displaced right kidney. For the last few years she has been losing weight; has had severe occipital headaches, and backaches at the mid-lumbar regions. She was told that she had pulmonary tuberculosis and, therefore, went to Liberty, N. Y. At the Sanitarium, no evidences of tuberculosis were found. After returning to New York, she came under the care of a neurologist, who pronounced her a neurasthenic. She was brought to the writer to be operated upon, to see if she had an abscess of the right ovary, that organ having been found enlarged by her physician. On opening the abdomen, it was seen that the right ovary was the size of a lime. The right pampiniform plexus was markedly varicose. The left adnexa were missing. The appendix was free and not enlarged, but the distal end was crinkled like the rattle on a rattlesnake.

The varicosities were double ligated with silk, and the appendix was removed. The ovary was not molested. The patient made an uneventful recovery, and has been entirely free from the chronic pain for the first time in eight years. She was seen six months later, and was a different woman, both in physique and disposition. She had had no pain nor nervous manifestations since leaving the hospital.

CASE V.—S. K.; aged twenty-six; married three years; one child, instrumental; one miscarriage, ten months ago; repair of cervix and perineorrhaphy two years ago. Now complains of continuous pain in the back and left iliac region, relieved only on lying down. Vaginal examination: pelvic congestion. Operation, September 21, 1914: tubes patent. Operation consisted in tying off and division of the left pampiniform plexus. Patient well.

CASE VI.—T. C.; aged twenty-five; married five years; no children, three miscarriages. Continual pain in the back and left iliac region, relieved on lying down. Vaginal examination; retroversion, uterus movable, pelvic congestion. Operation, December 7, 1914. Left pampiniform double ligated and divided. Tubes were patent. January 21, 1915. Patient well.

40 EAST FORTY-FIRST STREET.

THE RELATION OF ALBUMINURIC RETINITIS TO THE TOXEMIAS OF PREGNANCY.*

BY

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ECLAMPSIA is still so poorly understood that it is worth while to make use of any and all means in its study which can possibly throw light upon its nature. The following paper is a brief study of the relation of albuminuric retinitis to eclampsia and nephritic toxemia. It has been my endeavor to examine the eyes of as many pregnant women as possible, who showed albumin and casts in the urine, who had had eclamptic convulsions.

Much has been written from time to time, about individual cases of albuminuric retinitis in pregnancy; *e.g.*, P. Mueller in his "Handbuch," 1889, and later Cohn, Silex, Axenfeld, Culbertson, Randolph, and many others. Wolff and Zade reported in 1914 the material from the Heidelberg "Frauenklinik" and made one of the most important studies on this subject. In the main their findings correspond closely with my experience, and the chief differences noted are due, for the most part, to differences in nomenclature and classification. For a clear understanding of the current German views regarding the classification of kidney complications in pregnancy, the reader is referred to the "Referat" by Zangemeister at the meeting of the German Gynecological Society, Halle, 1913. Briefly, all such cases which have convulsions are called eclampsia. A distinction is made between "*nephropathia in graviditate*," which is thought to be a functional disturbance of the kidneys brought about by pregnancy (including Leyden's kidney of pregnancy), and "*nephritis in graviditate*" on the other hand, which may come on during pregnancy, but usually is an exacerbation of some previous nephritic lesion. It is granted that nephropathia cases may develop eclampsia, and may even go on to chronic nephritis. Koblanck found that this occurred in 6.5 per cent. of seventy-seven cases, and Zanger-

* The first part of this work was done in the second "Frauenklinik" in Vienna and was reported at the "Naturforscher Versammlung" in Vienna, Sept., 1913. The rest of the work was done in the obstetric wards of the Johns Hopkins Hospital.

meister, Jaschke, Seitz and others support this view. As Fleischlen pointedly remarks, however, the proof must be presented that nephritis had not existed before pregnancy. It is furthermore granted that "*nephropathia in graviditate*" tends to recur in subsequent pregnancies. It would seem, however, that many cases of "*nephropathia*" would under our classification be designated as preeclamptic toxemia.

This short résumé serves to emphasize the confused state of our knowledge on the subject. It may explain why Silex, and Wolff and Zade were able to observe albuminuric retinitis in cases of simple "*nephropathia*," whereas Zangemeister and the author contend that such a finding indicates a nephritis. Wolff and Zade call their case No. 85 "*nephropathia*," but I do not consider that a nephritis can be ruled out, and I am confident that the prognosis for subsequent pregnancy in this case would be very poor. Case No. 88 of their paper is the only one which does not correspond to my experience. This patient had retinitis and eclampsia; albumin appeared twenty-three days before labor and disappeared within four weeks after labor. Unfortunately the notes are not full enough to permit of discussion.

Wolff and Zade found retinitis in ten out of thirty-one cases of chronic nephritis in pregnancy, and emphasized the serious prognosis in such patients. They reported a primary mortality of five, and out of seventeen cases which they were able to follow, three had died within two years.

In 1908, Dr. Hiram Woods wrote a paper on the ocular complications of pregnancy, in which he enumerated four types:

1. Uremic blindness without ophthalmoscopic lesions, as seen in eclampsia.
2. Albuminuric retinitis of pregnancy.
3. The rarer forms; loss of central or peripheral vision, due perhaps to a retrobulbar neuritis, and
4. A form of neuritis not essentially suggestive of the albuminuric type, but showing many retinal exudates and hemorrhages.

The last two types he considered to be due to an underlying toxemia. This is the only paper with which I am familiar, where an attempt has been made to correlate the ocular disturbance with the type of toxemia present, and it will be seen that all the cases in this paper fall into class two as suggested by Dr. Woods, except Case IX, which was not pregnant. This case may perhaps correspond to cases which are more or less familiar to ophthalmologists and to which Dr. Woods referred in his paper, namely, retinal exudates and hemorrhages in chlorotic girls with menstrual disturbances, but in view of

the kidney lesion which developed in my patient, the possibility of a nephritic basis for the retinal lesions must be kept in mind.

With the growth of the conservative treatment in eclampsia, more especially in Europe, it would seem very advantageous to be able to distinguish early in the course of the disease, between the two main types of toxemia; for while the Stroganoff, Zweifel, or Dublin procedures may be applicable to true eclampsias, I take it that in most cases of nephritic toxemia little is to be expected of the conservative therapy, and the uterus should be emptied as soon as possible. Thus, when a patient enters the hospital with convulsions, edema, casts and albumin, and a high blood pressure, we are often unable to say immediately, whether or not we are dealing with a true eclampsia or a nephritic toxemia with convulsions. Only the clinical course can clear up the diagnosis. If we obtain a history of sudden onset of all these symptoms with epigastric pain, and know that the albumin has only recently appeared in the urine, we are almost certain that it is the former. If, on the other hand, the history points to an insidious onset of weeks or months, previous scarlet fever, typhoid, tonsillitis, or nephritis itself, and a gradual appearance of albumin, we assume that a nephritis is the fundamental lesion. I desire to show that, in my experience, retinal lesions are found in the latter type only, and, to call attention to the slow convalescence and persistence of albumin and casts in all cases where such lesions are found. This latter point is of great service in prognosis, for not only must the patient be kept under treatment for several months, but future pregnancies must be avoided.

Retinitis occurs in roughly 20 per cent. of all cases of chronic nephritis. Figures in the literature vary from 7 to 31 per cent. It also occurs in acute nephritis and has been noted in cases of so-called "kidney of pregnancy." Sillex claimed that retinitis occurred only once in 3000 pregnancies. I was able, however, while in Vienna, to observe six cases in six months, during which time about 1800 cases were delivered and observed. Three of these cases occurred in a consecutive series of sixteen so-called "eclampsias," and three among twenty-five women with nephritis who had no convulsions. It is more than probable that many cases are constantly overlooked, for unless the macula is involved, or a more or less extensive lesion of the optic nerve or blood-vessels occurs, the patient has no symptoms and refuses to believe that there is anything wrong with her eyes. It is also possible that retinitis may be present before albumin appears in the urine. This is often seen in general practice where chronic nephritis is first discovered by the ophthalmologist. It is very unusual,

however, for retinal lesions to precede the appearance of albumin in acute nephritis, and, although Case IX was not pregnant, I may be permitted to present it as especially interesting in this regard.

The symptoms of retinitis are briefly as follows: Frontal headache, malaise, vomiting, flashes of light or black specks before the eyes, a halo about lights, a transient evening dimness of vision which is occasionally one of the first symptoms, and a gradual loss of vision, even amounting to complete amaurosis.

Diagnosis is simple when the patient is not in coma or having convulsions; mydriatics should always be used and the electric ophthalmoscope is almost indispensable for ward work. The eye lesions, when found, should be corroborated by an ophthalmologist whenever possible, as was done in most of the cases in this paper.

The prognosis as far as the retinal lesions are concerned, is usually good, except in cases of advanced chronic nephritis, and even here great improvement may take place after labor. It would thus seem that pregnancy may be the exciting cause of an acute exacerbation of a chronic nephritis, and the prognosis *quoad vitam*, which outside of pregnancy, is usually supposed to mean death within two years, is not so grave if the patient recovers satisfactorily from the acute exacerbation. Culbertson cites thirty-six cases of whom 16.6 per cent. became totally blind, and 58.3 per cent. had permanent injury to the eyes. Such has not been my experience as my cases probably included milder lesions.

The question has often been raised as to whether pregnancy should be interrupted in the presence of albuminuric retinitis. Most authors answer in the affirmative. Pooley, Culbertson, Woods and many others favor interruption whenever retinitis is found. These papers have usually considered only the effect upon the eyes, whereas from the point of view of the obstetrician such a generalization must be considered most carefully. It is well known that retinitis is apt to recur in subsequent pregnancies, and may even lead to atrophy of the optic nerve, as in Foerster's case. A patient who had gone through a previous pregnancy with albuminuric retinitis had "eclampsia" one and one-half years later. This time, however, blindness was complete and she later recovered the use of only one eye. On the

* I understand that more recent work on the subject of albuminuric retinitis in chronic nephritis has shown that, in many cases, prognosis is not so bad and that cases have been observed which have lived ten or even fifteen years after the occurrence of retinal lesions. Such lesions may have occurred during an exacerbation. Moreover, careful medical supervision can do much for such chronic cases.

other hand, to show that there is a wide variance in the prognosis I would call attention to the case of Axenfeld. His patient, who had in her last pregnancy suffered from albuminuric retinitis, became pregnant again. Albumin appeared in the urine at the third month, but the patient desired to continue to term because she had in the meantime become a widow. Pregnancy was completed without any untoward symptoms of consequence. Generally speaking, however, interruption of pregnancy is indicated and sterilization may even be considered advisable.

While making this study I examined all waiting patients in the second "Fraunklinik" in Vienna over a period of two months, in all about 250 cases. Among these I found Case I, who had a well-developed retinitis four days before convulsions occurred. Another case, the full records of which I have not been able to obtain, came to the clinic just before I left Vienna; a young primipara, seven months pregnant, with marked edema of the legs, genitalia, abdomen, face and arms. Albumin and casts were found in large quantities and a high blood pressure. A small retinal hemorrhage was seen in one eye, but in spite of this finding, it was decided to await a viable child, keeping the patient in bed and on a strict diet. Scarcely two weeks had passed when convulsions supervened, and a dead child was born. At the time of labor, the retina of both eyes was covered with exudates and hemorrhages. This case illustrates the point I wish to make, namely, that when retinitis is present the kidney lesion is primary and more or less extensive in character, little can be expected of conservative treatment, and radical procedure is indicated.

The first nine cases were observed in Vienna by myself, except Nos. IV and V, which were found in the records of previous years. In the course of twenty years, eye examinations were recorded in only four cases. In the two cases presented in this paper retinitis was found. The last four cases occurred at the Johns Hopkins Hospital.

As is well known, Dr. Williams differentiates more or less sharply between eclamptic toxemia and nephritic toxemia with convulsions. In many cases it has been found impossible to do this until autopsy or the subsequent history has cleared up the case. Such was No. XI. On discharge, in spite of the finding of retinal hemorrhages and albumin persisting in the urine over two weeks, the case presented the aspects of an eclamptic rather than a nephritic toxemia. This view was based on the rapid recovery and on the blood studies. When the control examination, however, showed that albumin and casts persisted over two months the diagnosis had to be changed, and the di-

agnostic as well as the prognostic value of positive retinoscopic findings was sustained.

I have also made a statistical study of all the "eclampsia" cases occurring in the second Frauenklinik in Vienna during a period of twenty years, 422 in all, to see if any conclusions could be drawn concerning the type of kidney lesion as shown in the onset and disappearance of albumin in the urine. In fourteen cases there was no albumin at the time of labor. Among eighty cases where urinary examinations were made during pregnancy, forty-four cases showed the first onset of albumin within one to two weeks of labor. Again, among 257 cases where records of urinary examination were kept during the puerperium, 40 per cent. showed a complete disappearance of albumin within fourteen days and a 15 per cent. more had only traces left. These cases undoubtedly represent the true eclampsias in which the kidney involvement was purely secondary to the toxemia and hence did not last long. Slemons emphasizes the excellence of the prognosis for future pregnancies in such cases.

It was not possible to get a good idea of the proportion of nephritic toxemias from the records I examined. A rough indication may be gained from the autopsy findings. The mortality during the twenty years was 21 per cent. Of these, eighty-four cases were autopsied, and it was found that twenty had true (primary?) nephritic kidneys, whereas in forty-four cases a note of "hemorrhagic hepatitis" (eclampsia liver) was made. Undoubtedly, some cases having liver lesions were overlooked, for microscopical studies of the liver were rarely made.

There is apparently no reason why a patient having an acute or chronic nephritis would not also develop during pregnancy a true eclamptic toxemia with characteristic liver lesions. This combination is recognized by almost all authors, but on going over the autopsy records in Vienna I was so struck with the occurrence of both lesions in the same patient, that it may be well to present a brief summary of some such cases. Five out of eighty-four autopsies showed both chronic kidney lesions and acute hemorrhagic hepatitis, and six more showed a definite acute nephritis, combined with the liver lesions; a contrast with the fatty, parenchymatous or cloudy swelling which is more typical of the true eclamptic toxemia. It was noted in the records that only forty-four out of the eighty-four cases showed liver lesions, so the proportion of combined cases is fairly high. In Case XI we may well have had a true hepatic toxemia as was indicated by the rapid recovery and blood studies; only an autopsy can make a complete diagnosis in such a case. There is no question,

however, that she had a true nephritis as well, though from the standpoint of insufficiency of the kidney function, it seemed to play a relatively unimportant part. Furthermore, it is impossible to state definitely that a true nephritis cannot originate during pregnancy and, as the direct result of an eclamptic toxemia, but it seems to me to be highly improbable.

Conclusion.—It has been my experience that albuminuric retinitis of pregnancy affords evidence strongly indicative of primary nephritis, though it is not always present in cases of nephritic toxemia.

2. The retinoscopic examination, when positive, enables us to make an early diagnosis of the underlying kidney condition, which at the present time, is sometimes impossible without autopsy findings or extended observation.

3. We are thus put in a position to make a more accurate prognosis with regard to convalescence and future pregnancies.

I am indebted to Professor E. Wertheim and Dr. J. Whitridge Williams for permission to use the material in their clinics, and to Dr. E. D. Plass, Resident Obstetrician in the Johns Hopkins Hospital, for the data concerning the chemical studies of the blood.

CASE I.—Nephritis "eclampsia." April 2, 1913. Thirty-two years, primipara. Measles and scarlet fever as a child. In 1909 typhoid fever with nephritis lasting one month. Last menstruation September 22, fetal movements for two months. Edema of the lower extremities and headache for three weeks, "flashes of fire" before the eyes for weeks.

Examination.—Marked edema; pulse hard; heart enlarged to the left; albumin and casts. Fundus 2 f. b. above umbilicus. Cervix closed, child alive. Eyes show retinitis albuminurica.

Therapy.—Rest in bed; milk diet.

April. 5.—Esbach, 0.6 per cent. Some vomiting, edema diminished; retinitis, however, increased.

April 6. Quantity of albumin rising. During the afternoon increasing dimness of vision and headache. 6 P. M., sudden amaurosis, fibrillary twitchings, most marked in eyelids, with slight trismus lasting one minute and followed by coma. 7 P. M., introduction of a balloon and venesection under anesthesia. Following this, marked restlessness. 11 P. M. chloral hydrate 3 grams per rectum under light chloroform anesthesia. April 7, 1.30 A. M., restlessness continued. Balloon expelled. Catheterization shows complete anuria. The membranes were ruptured, the head perforated and extracted. Child weighed 680 grams without brains. Pituglandol and secacornin given to control hemorrhage. 4 A. M., morphine 0.01 given. 7 A. M., 300 c.c. urine voided. Patient's condition improved.

Clinical Course.—Afebrile. Esbach varied between 2 and 0.8 grams. On the twelfth day transferred to the medical clinic.

Summary of Eye Examinations.—Four days antepartum, one small exudate; three days antepartum, two exudates. On the day of labor, edges of both discs blurred. Two days postpartum fresh exudates and hemorrhages. Eight days postpartum more fresh exudates and hemorrhages; frontal headache intense for past two days, vision poor.

Control examination four and one-half months postpartum. Traces of albumin and casts. Retina of both eyes clear. Phenol-sulphonephthalein appeared in twelve minutes, and in two hours 54 per cent. was obtained.

CASE II.—Nephritis "eclampsia" intrapartum. April 2, 1913. Thirty-four years, primipara. No history of previous illness. For a few days past dimness of vision, for which an ophthalmologist gave her drops. Last period July 15.

Examination.—Pulse hard. Albumin in large quantities. Fundus 4 f. b. above the umbilicus. Child alive.

During labor on April 3, patient had six eclamptic convulsions.

Therapy.—Venesection, chloralhydrate and morphia. Three hours after the last attack forceps was applied on account of a rapidly growing hematoma of the vulva. Child 46 cm., 2070 grams.

Clinical Course.—Febrile, 40.5 degrees on the eighteenth day. Albumin was constantly present till discharge on the twenty-eighth day, ranging from $\frac{1}{4}$ to 2 grams per liter.

Summary of Eye Examinations.—A few hours after labor, edges of O. D. very hazy; small exudates and several hemorrhages in both eyes, four days postpartum. Right papilla much swollen and on this side the retina is veiled and riddled with exudates and hemorrhages. Left papilla much swollen about three diopters, no edge visible. Arteries small, veins swollen, many exudates. Patient can count fingers at 60 cm. Twelve days postpartum eye condition much improved, choked disc less marked. Twenty-one days postpartum, one fresh hemorrhage, otherwise as before.

Control Examination.—July 25, two and one-half months postpartum. Blood pressure still elevated, urine increased in quantity, traces of albumin but no casts. Phenolsulphonephthalein appeared in seven minutes and in two hours 75 per cent. was obtained. Eye examination: Edges of optic disc in left eye somewhat indistinct, otherwise all traces of neuroretinitis are gone.

CASE III.—Nephritis "eclampsia" June 13, 1913. Thirty-four years, primipara. Measles in childhood. Last menstruation September 15. Swelling of the feet for three days past, stomach trouble for five days, yesterday vomiting, no eye symptoms. One eclamptic convulsion before admission.

Examination.—Fundus 2 f. b. above umbilicus, child alive, slight edema. Esbach, 25 grams per liter, many casts. Spontaneous labor, child 36 cm., 1050 grams, died on the thirteenth day. Following labor two more convulsions. Therapy; morphia and chloralhydrate.

Clinical Course.—One rise in temperature. Esbach came down

to 1 gram. Phenolsulphonephthalein one week after labor appeared in seven minutes, 52 per cent. in two hours.

Summary of Eye Examinations.—July 16, left eye normal, under the right macula a diffuse rounded hemorrhage. Five hours after this examination a fresh fan-shaped hemorrhage was seen in the right eye, which had not been there previously. June 19, the hemorrhages are healing.

Control Examination.—August 20, two months postpartum. Patient feels well. Eyes negative, albumin and casts present. Phenolsulphonephthalein appeared in seven minutes, 67 per cent. in two hours.

CASE IV.—Nephritis “eclampsia” Dec. 6, 1909. Thirty years, para-ii. Scarlet fever in childhood. Has had one febrile abortion.

Examination.—Considerable edema; albumin in large quantities; casts not found on one examination. Labor spontaneous, child 54.5 cm., 4000 grams, alive. After labor the patient had three eclamptic convulsions. Therapy; hot packs.

Clinical Course.—Esbach dropped from 12 to $\frac{3}{4}$ grams on discharge thirty-six days after labor. On account of eye symptoms patient was examined seven days postpartum, when the following note was made: Neuroretinitis; papillæ indistinct, moderately swollen; arteries narrow, retina about the papilla clouded; small marginal hemorrhages.

CASE V.—Nephritis “eclampsia.” Oct. 19, 1904. Thirty-nine years, para-ix, seven abortions, one premature labor. Scarlet fever, diphtheria and smallpox in childhood. For the past fourteen days edema, dizziness and headache. Twelve days before labor, dimness of vision, which later increased to complete amaurosis.

Examination.—Marked edema, albumin and casts in large quantities.

Premature labor supervened. Child, 36 cm., 750 grams and extracted by the breech. One eclamptic convulsion occurred fifteen minutes postpartum.

Clinical Course.—Afebrile, no notes concerning the urine. Eye examination: on account of disturbance of vision the eyes were examined six days after labor, at which time punctiform hemorrhages were found.

CASE VI.—Nephritis with premature separation of the placenta. Thirty-two years, primipara. Feb. 15, 1913. In childhood, measles, diphtheria, whooping-cough and scarlet fever, the latter with marked edema. Last menstruation June 2. For ten days gradual swelling of the feet and face.

Examination.—Marked edema, albumin and casts in large quantities. Child dead. Cervix 3 cm., some bleeding. Therapy, incision of the cervix, perforation and extraction. Pituglandol and secacornin were given to control hemorrhages. Child 40 cm., 1570 grams, without brains.

Clinical Course.—Afebrile, albumin and casts continued present until discharge on the twenty-eighth day. Esbach ranged between 12 to 2 grams per liter.

Summary of Eye Examination.—February 15, left eye normal, right eye one exudate. February 18, exudates in both eyes, one hemorrhage in the right eye. February 19, both discs slightly swollen. February 21, headache is less marked, eyesight better, exudates cover some of the blood-vessels for considerable distances, swelling of the discs less marked. March 14, exudates nearly gone, some showing fatty degeneration, others beginning pigmentation.

Control Examination.—September 6, seven months postpartum. Patient feels well. Eyes show no abnormalities aside from a few flecks of pigment in the retina. Esbach 5 grams per liter, casts present. Phenolsulphonephthalein appeared in twelve minutes, 62 per cent. in two hours. Patient was seen again in December, ten months postpartum, at which time a new pregnancy of six to eight weeks' duration was diagnosed. Esbach 3 grams, casts present. Eyes normal at this time. It was impossible to follow this case further.

CASE VII.—Nephritis. June 9, 1913. Thirty-two years, primipara. Severe rickets in childhood, learned to walk at seven years of age. Has had very severe tonsillitis three times. At twenty years of age an "exudate" in the left inguinal region. Last menstruation November 27. Vomiting, malaise and headache during the past three months. For six weeks marked impairment of vision, for three days fetal movements have not been felt. Two days ago patient had severe nose bleed.

Examination.—Small hard pulse, slight edema, signs of rickets. Albumin and casts present, no signs of fetal life. Cervix closed. Eye examination showed a severe neuroretinitis with many exudates and a few hemorrhages, moderately swollen discs, small arteries and engorged veins. Phenolsulphonephthalein on admission appeared in twenty minutes, and in two hours only 10 per cent. was obtained. June 11, introduction of a bougie, spontaneous labor the following day. Child 35 cm., 700 grams macerated.

Clinical Course.—Afebrile. Discharged on sixth day.

Control Examination.—August 23, two and one-half months postpartum, Esbach 2 grams per liter, casts present. Phenolsulphonephthalein appeared in ten minutes, in two hours 28 per cent. Blood pressure high. Eye examination: both discs are moderately swollen, arteries small, veins large, many large and small hemorrhages and fresh exudates. The old exudates have partly undergone fatty degeneration. Eyesight somewhat improved and aside from weakness, patient feels fairly well.

CASE VIII.—Nephritis. August 16, 1913. Thirty-three years, para-iv. No diseases of childhood. Pneumonia at seven, pleurisy at ten and typhoid at seventeen years. All labors normal. Last menstruation December 15. Pregnancy up to the present normal. (Patient very ignorant.)

Examination.—Marked anemia, dyspnea and edema of the hands, legs and abdomen. Heart dilated and enlarged in both directions. Neck veins markedly swollen, slight cyanosis. Fundus three finger

breadths below xiphoid, child alive. August 16, eye examination negative. With rest in bed and diuretics the condition improved somewhat. August 18, symptoms much worse. Patient delivered herself before anything could be done for her. August 19, eye examination showed a few hemorrhages and one beginning exudate in the right eye. Esbach $\frac{3}{4}$ gram. Phenolsulphonephthalein 40 per cent. in two hours. August 21, the temporal edges of both discs are pale. Moderate, but definite retinchoroiditis centralis was seen. August 22, fresh hemorrhages and exudates. August 23, on account of the severity of the symptoms the patient was transferred to the medical clinic but failed to respond to treatment and died on August 25.

Autopsy.—Acute parenchymatous nephritis and albuminuric hemorrhages in the epi- and endocardium. Hydrothorax, hydropericardium, edema of the lungs, general anemia, fatty degeneration of the heart, "Tigerung" of the myocardium, parenchymatous degeneration of the liver, general anasarca.

CASE IX.—Nephritis. (Not pregnant.) June 14, 1913. Twenty four years, nullipara. No history of childhood or other diseases. Menstruation regular until June 6. Since then, hemorrhage has been profuse and continuous.

Examination.—Temperature 37.5° C. Pulse 116, marked anemia, heart and lungs negative, no colostrum, hymen lacerated, cervix slightly open, uterus perhaps a little enlarged. June 17, because of the possibility of tubal pregnancy a curettage and posterior celiotomy was done. No evidence of pregnancy was found even in the microscopical examination.

Clinical Course.—Patient developed a severe pelvic peritonitis, which was drained and an inflammatory tumor of the right adnexa remained after two months giving, however, almost no symptoms. On the seventh day after operation, patient complained of poor vision. On the ninth day several small single and conglomerate exudates were found in both eyes. (Dr. Lindner of the Fuchs Clinic made a diagnosis of albuminuric retinitis.) On the eleventh day, slight edema was noted. Two days later, the exudates increased in number, a few hemorrhages were seen and the edge of the papilla was indistinct. On the fifteenth day, the eye condition was slightly improved. Twenty days after operation and thirteen days after the onset of symptoms albumin appeared in the urine for the first time. Forty-three days after operation traces of albumin, no casts, phenolsulphonephthalein 43 per cent. in two hours. Sixty-one days, retinitis nearly healed, veins still swollen, blood pressure not high, albumin negative. Phenolsulphonephthalein 57 per cent. in two hours.

CASE X.—Nephritic Toxemia No. 6950. Dec. 30, 1914. Thirty-eight years, para-viii. Sixth child lived only a few minutes; seventh child lived three days. Patient was told she had heart trouble since an attack of typhoid fifteen years ago. April, 1914, an attack of dyspnea, orthopnea, vertigo, palpitation and edema of the legs lasting a few months, improved under rest in bed and medication. Last menstruation in June, lasting two weeks. Since

July some edema of legs, much increased during last attack of "heart trouble" in September. Patient then improved till seven weeks ago when she noticed flashes of light before the eyes and later black specks. Gradual failure of vision and frequent headaches during last six weeks. For three weeks, edema of the abdominal wall. Dyspnea has become progressively worse. Constant nausea and loss of appetite. Patient has taken Epsom salts daily for the last three weeks. During the early part of pregnancy patient voided about 2000 c.c. of urine in twenty-four hours. For the last three weeks only 250 c.c.

Examination.—Edema of the eyelids, face, abdominal wall, legs and back. Mucous membranes cyanotic. Lungs clear, respirations increased, some dyspnea. Abdomen, seven to eight months pregnancy.

At 3.30 P. M. on the date of admission patient was bled for 1000 c.c. Blood pressure remained from 210 to 220 mm. Hemoglobin immediately after venesection 91 per cent., at 8 P. M. 75 per cent. The following morning at 5 A. M. labor pains began and a seven and one-half months' child was born at 10 A. M. Blood pressure after labor 194 mm. Blood lost 80 c.c. Dyspnea and cyanosis. Child died sixteen and one-half hours after birth. It was 41 cm. long; weighed 1545 grams.

Patient improved slowly after labor; blood pressure remained high; albumin fell but was present with casts on discharge, fifteen days after labor. Five days after labor phenolsulphonephthalein test showed in two hours only 6 per cent. output. Hydrogen-ion concentration of the blood was found normal. Studies of the blood showed a non-coagulable nitrogen coefficient, 6.73 per cent. showing a severe degree of nephritis.

Summary of Eye Examination.—On admission the nasal borders of both discs were slightly blurred, vessels tortuous and engorged. In both eyes small hemorrhages and beginning dull gray exudates were seen. Two days after labor these gray exudates became white and were still present on discharge. Patient died at home in another State ten days after leaving the hospital.

CASE XI.—Nephritic Toxemia, No. 6996. Jan. 18, 1915. Twenty-seven years, para-iii. Previous labors spontaneous at term. No period since previous birth. Patient had always been well till she had typhoid six years ago. Since then frequent headaches. Three years ago tonsillitis. Edema of the hands and face during the past five weeks. Blurring of vision each morning for past few weeks. No history of similar trouble in previous pregnancies. Urine decreased in amount. Patient sent to hospital on account of kidney trouble.

Examination.—Patient seemed dull and toxic. No dyspnea. Marked edema of face, hands and arms as well as legs. Esbach 11 grams, casts present. Blood pressure 208 mm. She was promptly bled for 250 c.c., when the blood pressure fell to 110 rising gradually to 168 a few hours later. Patient was purged and given a hot dry pack.

On the following day the balloon was introduced and patient again bled for 500 c.c., blood pressure falling to 130. Pains started promptly and child was delivered within three hours; 44 cm. long, 2215 grams, in good condition. Clinical course after labor: rapid improvement and disappearance of edema; albumin fell, but was still present with casts on discharge thirteen days after labor. Phenol-sulphonephthalein test seven days after labor in two hours 53 per cent. output. Blood pressure fell to 110 on the tenth day.

Summary of Eye Examinations.—One day before delivery, retina of both eyes quite glistening, in the left eye small hemorrhage was seen just below the macula. This disappeared before discharge. No exudates. Studies of the blood showed little disturbance of the kidney function as expressed in the noncoagulable coefficient.

Control Examination.—April 17, 1915. Patient and child doing well. Patient suffers some constantly from headache. Eye examination negative. Urine; a few casts, albumin present. Esbach, $\frac{1}{2}$ gram per liter. Blood pressure 130 mm. Patient was then referred to the medical dispensary for supervision.

Comment.—On admission the patient seemed to be nephritic rather than preeclamptic in character, but the rapid recovery, the fall of the blood pressure following labor and the studies of the blood seem to indicate the latter. The control examination, however, showing the persistence of albuminuria would indicate that the underlying condition had been a true nephritis leaving it questionable whether or not an eclamptic toxemia had been added thereto. This finding corroborates the eye examination.

CASE XII.—Nephritic Toxemia, No. 7047. Feb. 23, 1915. Twenty-five years, primipara. Last menstruation seven months ago. No history of previous illness obtainable. (Patient could not speak English.) About four weeks ago, edema of the feet was noted which later involved the legs, lower abdomen and face. Frontal headache daily for two weeks. For the past twenty-four hours considerable epigastric pain. No visual disturbances. No nausea, vomiting, fainting attacks or convulsions. Urine has been scanty for the past two or three days.

Examination.—Edema of the face, lower abdomen and legs. Heart and lungs negative. Fundus two finger breadths below the xiphoid. No signs of fetal life. Blood pressure 200 mm. Urine, 26 grams of albumin per liter, and many casts. Patient was put on milk diet, forced water, and given calomel and salts. The following day the patient was bled for 900 c.c., blood pressure falling to 176. During the following week, the condition improved but slightly, albumin falling at no time below 4 grams to the liter. Four days before labor patient was again bled for 500 c.c. No improvement was noted and the albumin rose to 24 grams on the day before delivery. Bougie was introduced on February 20. The following day castor oil and quinine was given without effect. February 22, bougie and packs were removed and the patient left undisturbed for twenty-four hours on account of the foul-smelling vaginal discharge. Febru-

ary 23, a balloon was introduced and labor proceeded spontaneously to a conclusion ten hours later.

Clinical Course.—Afebrile. Urinary output increased satisfactorily, blood pressure fell to 150 on the sixth day but did not fall lower than this. Albumin fell markedly but was still present on discharge sixteen days after labor. Study of the blood showed a noncoagulable nitrogen coefficient 6.12 per cent.

Eye Examination.—February 15, exudates in both eyes near the optic disc. February 24, one or two new areas of exudation seen in the left eye. Patient became unruly, and refused to allow her eyes to be examined so that no control could be made.

Comment.—This case was clearly a nephritic toxemia.

(1) Blood pressure remained high 150 mm. seventeen days after delivery.

(2) Albumin and casts persisted until discharge.

(3) Albuminuric retinitis.

(4) Marked retention of nitrogen in the blood which is noted only in nephritics.

(5) Diminished phenolsulphonephthalein excretion, in two hours 47 per cent. fourteen days after delivery.

Control Examination.—May 3, 1915. Patient says she is not well. Blood pressure 160 mm. Urine shows albumin present Esbach, 0.1 per cent. Hyaline and granular casts present, acid reaction. Specific gravity 1012. Phenolsulphonephthalein, in two hours, 63 per cent. Patient referred to the medical dispensary. Eye examination at this time showed retina and discs of both eyes practically normal. A few dull gray areas were seen indicating old and almost absorbed exudates.

CASE XIII.—Nephritic Toxemia, No. 7139. April 5, 1915. Forty-three years, para-vi. Two miscarriages. The oldest child seventeen years, youngest twelve and one-half years. Miscarriages at six to seven months, date not recalled. Last five labors said to have been instrumental. Last menstruation not recalled. Patient admitted April 5, with convulsions. Following history obtained from the husband:

During past six months headaches over the top of the head, constantly present the last few days; edema of the feet and legs for the last three months becoming gradually worse. No retention of urine. 11 P. M. the night before, patient had cramps in the stomach and was given 2 grains of calomel without relief. During the following ten hours frequent attacks of abdominal pain. First convulsion 10 A. M., second at 10.30. The outside obstetrical service was called and found the patient in a semiconscious state, blood pressure 205 mm., and large amounts of albumin in a catheterized specimen. Cervix was closed but there was some bloody vaginal discharge. Patient vomited at this time. Third convulsion at 2 P. M. after which she was taken to the hospital.

Examination.—Heart and lungs clear; abdomen shows full-term pregnancy in L. O. T. Some edema of the extremities and lower abdominal wall. Blood pressure 210, canal admits one finger, pul-

sating mass 60 to 80 per minute felt in front of the head. Patient was put in a hot pack, given Epsom salts, forced fluids and diuretin.

3.45 P. M., fourth convulsion lasting for three minutes, after which patient was bled for 800 c.c., blood pressure falling to 120. 5.40 P. M., fifth convulsion lasting three minutes followed by a hot pack. At 6.30 morphia gr. $\frac{1}{4}$ was given and Murphy salt solution started. Patient perspired freely and continually asked for cold water. 8.46 P. M., sixth convulsion lasting one and one-half minutes.

As the patient was not improving under the eliminative treatment, a cervical and vaginal pack was introduced at 11.45. Following this, pains became stronger.

1.30 A. M., seventh convulsion, followed by coma. The head at this time was found to be on the perineum, and with pressure from above delivery was easily accomplished. Child 53 cm., 3740 grams. Slight beginning maceration. The cause of death, prolapse of cord.

Clinical Course.—No further convulsions, afebrile. Blood pressure remained high, 150 on discharge, albumin and casts were still present. Phenolsulphonethalein on twelfth day, 56.5 per cent. in two hours.

Summary of Eye Examination.—Two days after labor. The edges of both discs were somewhat hazy. In the right eye two or three pale areas taken to be exudates were seen. In the temporal quadrants of both eyes, one or two small hemorrhages. In the left eye above and below the macula, three definite exudates. In the lower temporal quadrant two small circular diffuse hemorrhages. On discharge fourteen days after labor, no hemorrhages were found but exudates in both eyes, those in the right eye in the process of healing.

Addendum.—Since writing this paper another case of neuro-retinitis has been observed. No new points of interest were noted.

CASES WHERE AUTOPSY RECORD SHOWED BOTH CHRONIC NEPHRITIS AND THE LESIONS OF ECLAMPTIC TOXEMIA.

CASE I.—1904, No. 2132. Thirty-eight years, para-ix. No notes about the pregnancy.

Examination.—Edema of the face. Coma. Eight and one-half months pregnant. Child 42 cm., 2600 grams. Stillborn. Albumin present in large quantities. Ten convulsions in all beginning nine and one-half hours before labor.

Therapy.—Chloroform, morphia, chloralhydrate. Delivered by Braxton-Hicks procedure. Patient died one and one-quarter hours after delivery.

Autopsy.—Chronic parenchymatous nephritis, hydronephrosis and atrophy of the left kidney, moderate hydronephrosis of the right. Eccentric hypertrophy of the left ventricle. Hemorrhagic hepatitis, and anemia of the brain. Three old echinococcus cysts.

CASE II.—1906, No. 562. Primipara, age not known. Ten

months pregnant. Edema of the face. Nine convulsions. Intense coma, large quantities of albumin and casts, suppression of urine. Patient delivered by means of balloon and craniotomy of the child, 49 cm., 3000 grams, without brains. Patient died fourteen hours after labor, temperature before death 40.4°C.

Autopsy.—Hemorrhagic hepatitis with extensive superficial parenchymatous hemorrhages and necrosis in the liver. Fresh hemorrhage in the left corpus striatum, perforating into the lateral ventricle. Hematoma of the tongue, fresh hemorrhages into the submucosa and mucosa of the stomach. Severe parenchymatous nephritis with considerable left-sided hypertrophy of the heart. Old adhesions about the spleen, liver and lungs.

CASE III.—1906, No. 938. Eighteen-year-old primipara. Edema of the vulva. Ten months pregnant. Child 50 cm., 3000 grams, lived. Eleven eclamptic attacks beginning nine hours postpartum, severe in intensity. Therapy, venesection morphium, hot pack. Blood pressure not appreciably increased. Patient died thirty hours postpartum with temperature at 41.2°C.

Autopsy.—Hemorrhagic hepatitis, parenchymatous nephritis, moderate hypertrophy of the left heart, edema of the brain.

CASE IV.—1908, No. 2131. Twenty-three-year-old primipara. Edema of the eyelids, lower extremities, abdomen and genitalia. Nine months pregnant. Esbach, 12 grams per liter, casts present, suppression of urine. Child 46 cm., 1900 grams, stillborn. Four hours before labor, onset of convulsions, thirty-seven in all.

Therapy.—Balloon, version and extraction morphium and hot packs. Patient died suddenly on the fifth day. Convulsions lasted during four days.

Autopsy.—Endometritis postpartum, scattered foci of bronchial pneumonia. Chronic parenchymatous nephritis, hemorrhagic hepatitis, hemorrhages into the pelvis and the kidney, anasarca and ascites.

CASE V.—1909, No. 1187. Twenty-five-year-old primipara. Ten months pregnant. Child 51 cm., 3150 grams, died during labor of asphyxia. Urine showed much albumin and blood. Five hours before labor convulsions began, eight or ten in all. Forceps delivery, patient died on the table after 5 c.c. of chloroform.

Autopsy.—Hemorrhagic hepatitis. Parenchymatous nephritis, with scattered hemorrhages in the glomeruli. Extensive adhesions of the kidney capsule with kidney substance on both sides. Dilatations of the left ventricle and scattered hemorrhages over the serosa of the auricle.

137 WEST LAFAYETTE AVENUE.

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PSYCHOSES AND NEUROSES OF PREGNANCY AND THE PUERPERIUM.*

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IN dealing with the neuroses and psychoses of the period of pregnancy, puerperium and lactation, we may consider that we are dealing with different degrees of the same subject. There is no clear-cut dividing line between the so-called neuroses of pregnancy and the well-defined mental states. It may be considered that the one imperceptibly merges into the other. This has led to the wide variation of opinion often expressed in the literature upon this subject, of the onset, the type of mental disturbance found, more particularly during pregnancy and sometimes during lactation.

It may indeed be stated that the mental states met with in pregnancy do not differ essentially from the clinical picture of mental disorders due to other causes. Indeed, it may be stated that the factors or the combination of factors producing mental disorders in pregnancy and during the period of lactation are the same, differing only in degree and intensity from those which are usually found in the consideration of mental diseases in general. Factors of heredity, the changes in nutrition, the infectious fevers, toxemia secondary to infections or due to visceral disease, emotional stress, traumatism, persistent painful conditions, anemia, etc., are all present in one degree or other when mental diseases are met with complicating this critical epoch in a woman's life.

Etiology.—In dealing with the subject of the etiology of the insanity of pregnancy and the lactational period, we are dealing with probably the most important factor both from the standpoint of the probabilities as to occurrence and diagnosis and the treatment of the condition. We are too apt to look upon the subject of mental

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disease as something in the light of a visitation from Providence or, at least, something apart from the subject of reasoning medicine. This is due, largely, I take it to the old suspicion that insanity was a disease of the brain. The more modern idea is that perversion of thought is not so much the manifestation of a local brain condition as the result of intoxication producing a derangement of mental action. We are not as much concerned to-day with the diagnosis with what the particular type of mental disease before us is, or whether it fits into some particular or peculiar syndrome placed in the text-book, as with what peculiar type of intoxication is acting upon the brain soil of a certain definite standard.

This entails therefore a determination of the type of brain material on the one hand and the source of derangement of visceral activity on the other. In order, therefore, that such a determination may be properly made we are concerned in our investigation not only with the life history of the individual before us but with the direct and collateral ancestry, as far as this can be worked out. This is the determination of the condition of the organ of the expression of symptoms. In order that we may determine how far certain definite essential factors may act upon this organ, it is necessary to know its quality and condition—so to speak. Dealing in the simplest terms of this problem, it may be stated that with a definite quantity of stimulation or irritation, the normal Latin brain or nervous system, the Celtic, the Scandinavian, the Saxon or the English brain will give varied and different reactions from the same causes whether this be a simple intoxication such as alcohol or opium, or a more complex intoxication from the infections or visceral diseases. When, however, we are dealing with abnormal types of brain from abnormal families with defective types of brain, with a nervous system handicapped by chronic intoxication from the parents, and more particularly from the mother, during pregnancy or from conditions of ill health and disease due to infections in early life, we are facing a complicated problem that needs careful study and keen judgment for proper interpretation. This, I take it, is the age in medicine of the careful history and a complete investigation of the patient, quite irrespective of his or her complaint. The failure to understand and interpret the clinical picture when mental disease complicates pregnancy, parturition or lactation, when it complicates surgical operation or even the infections, I find, is largely due to an incomplete history of the patient and incomplete knowledge of the human machine. The physician with a complication in pregnancy is either unable to give the specialist even the barest details of a family history,

and not infrequently has relatively little knowledge of the functional deficiency of the organs in the body other than the one with which he is immediately dealing. He will make an arrangement for a consultation expecting that in from fifteen to twenty minutes, or at the most a half hour, a rational opinion of any value will be given in that time. I might state here that consultation work of this type is not only unsatisfactory to the specialist, but often leads to mistakes both as to diagnosis and prognosis. I take it that the examination of the simplest case of nervous or mental disorder entails not only a careful family investigation above referred to, of the previous life of the patient in all its aspects, but also a physical examination and clinical investigation taking at least three to four hours of close work, in order to furnish an opinion of real scientific value.

Heredity.—While heredity is not considered at the present time to be as important in its influence in the production of nervous and mental disorders as it was two or three decades ago, it is still an extremely important factor in insanity during pregnancy and lactation. In one of the most recent articles on this subject, by Tomlinson, in twenty cases in fifty-one, there was a heredity history of insanity. This states in a general way the influence of heredity in this group of cases.

Macdonald	in 66 cases of "puerperal insanity" found 17 hereditary.
Reid	in 111 cases of "puerperal insanity" found 45 hereditary.
Leubben	in 181 cases of "puerperal insanity" found 55 hereditary.
Stephansfeld	in 30 cases of "puerperal insanity" found 14 hereditary.
Webster	in 131 cases of "puerperal insanity" found 51 hereditary.
Total,	519 182
About 35 per cent.	

These percentages would now be perceptibly raised with a more careful investigation in the collateral branches in the family. Probably the next most important factor in etiology next to heredity is the presence of nervous or mental disorders during the previous lifetime of the patient. Again I quote Tomlinson who states that of those who became insane during the first half of pregnancy of sixty cases studied, eighteen recovered; thirteen partially recovered; twenty-seven lapsed into dementia and two died. Those who lapsed into dementia were primary degenerates, that is, they became insane during adolescence; fifteen were consequential degenerates, that is, they became insane during adult life. One is classed, unstable; one, the outbreak of insanity occurring in connection with maternity was the second from which she had suffered. Of those who partially recovered four were unstable; seven consequential, and two

primary degenerates. It would be well to bear in mind in this connection that in taking the history of the patient that all forms of nervous disorders, particularly nervous breakdowns in early adult life should be carefully inquired into for the simple reason that even severe mental disturbances is usually spoken of in the family and afterward believed in as cases of nervous exhaustion or simple nervous breakdown. A history from a male member of the family is much more likely to be of value than one from the women, more particularly the mother. It may be stated as a general rule that a well-defined mental break during the period of adolescence with neurosexual delusions is very prone to be associated with severe mental symptoms during pregnancy or during lactation.

Moral Causes.—Next in importance to this group of cases are those which might be termed moral causes. Moral and physical shocks are ever a varying quantity. The tremendous waste of nervous energy entailed upon continuous worry during the pregnancy period to which is added the enormous outlay during parturition to which is sometimes added persistent vomiting, insomnia, etc.; all of these become imperative determining factors in the production of mental disease. This is more particularly shown in the illegitimately pregnant. Clouston, for example, assumes that 25 per cent. of his cases occurred where the offspring were illegitimate. Bevan Lewis, on the other hand, in an analysis of 1866 cases in the West Riding Asylum found illegitimacy in only seven.

In dealing with the history of the ancestry the graver neuroses, more particularly epilepsy, are of as serious consequences as direct heredity of mental diseases. Tomlinson found next in frequency to such mental diseases in the ancestry in nine cases, the heredity of consumption. Hysteria *per se* in the ancestor or in the patient means very little as to the probability of incidence of mental diseases. It is, however, important in association with faulty training and lack of control, in making the period of pregnancy in a woman who does not desire it, a burden leading to a nervous breakdown which may entail serious mental results. It may be perhaps this group of women that Fordyce Barker refers to in thirteen cases of puerperal insanity in the wives of physicians, all but one of them primipara and attributes it to the fact of their reading their husband's books on obstetrics.

Next in importance to these factors is the factor of an underlying intoxication either acquired or inherited, such as latent syphilis. Such an intoxication process often leads to the transformation of what would be ordinary and simple febrile delirium—a transient

state due to the pain and shock of delivery—into a prolonged mental condition. Conditions not only of kidney disease or what is much more important in this connection, kidney insufficiency, are potent factors in the production of mental disorders in unstable individuals. Probably the most important factors, however, in direct connection with the period of pregnancy and of lactation are those of general nutrition, pyogenic processes and anemia. Bevan Lewis found a chlorotic type of anemia in all of eight cases examined. Hemoglobin percentage was as follows: 20, 24, 28, 32, 55, 60, 74 and 78. This condition of anemia is naturally found associated with conditions of malnutrition. It is here that either active or latent tuberculosis becomes an important factor. Not only does this disease produce a hypersensitive and hypersuggestible condition of the nervous system, but the patient is usually under weight, with extremely quickened reflex activity, all of which produce during the period of pregnancy a drag on the nervous system which is much more likely to become manifest, however, at the time of delivery or during lactation in the development of mental symptoms. The low blood pressure of both healed and active tuberculosis may be an important factor in producing malnutrition of the brain with pathological suspicion leading to delusions of persecution. It is too soon to speak of the results of the studies in protein intoxication as shown by the Abderhalden test. Here the internal secretions may play an important part—by themselves or in association with other factors. That intoxication from the thyroid, pituitary and the sexual organs, together with a low blood pressure or renal insufficiency may in themselves produce serious mental disorders is well known. The probable influence of tuberculosis as a factor in the production of mental disorders of adolescence in all probability acts in this way. During the period of lactation, we have to consider as additional etiological factors the shock of prolonged, difficult and painful labor, anemic conditions secondary to postpartum hemorrhage, reflex conditions due to pelvic conditions, the nervous exhaustion incidental to the prolonged suckling of the child more particularly in women of poor nutrition and under bad hygienic surroundings, etc. All of these factors, however, should be perfectly evident to the physician facing mental disease as a complication at this period.

Symptomatology.—It is often stated that the mental disease of pregnancy or during lactation is of sudden onset. This may be true in cases of sudden loss of kidney efficiency or to some sudden intoxication from other sources. It is, however, as a rule, only apparently so, because deviation from the normal is rather expected of the preg-

nant woman and it is only when the mental condition becomes very manifest either through periods of exceptional mental depression or exceptional excitement that the attention is directed toward the development of mental disease. As a rule, the loss of mental tone must indeed be very marked in order to attract attention. It requires not much over 50 per cent. of the mental tone of an individual to carry on the conventional functions of life. It is only when the reduction in the mental tone is sufficiently great to interfere with relatively normal activity that attention is attracted to it. In a recent case of unquestionable mental disturbance as manifested in the letters and diary of the patient, that existed for a period of at least three months or so, the family were quite insistent that the patient was absolutely normal up to three days before the examination. It may be stated that, as a rule, the onset of this disease is relatively slow. It may be stated also that the more gradual the onset, the less intense the symptoms are likely to be, and the more likely the disease to take the form of a delusional chronic state in contradistinction to the active maniacal or melancholic state in cases of acute onset. It has always been noticed that where the mental state during the period of pregnancy is one of depression, the mental state after parturition is likely to be the reverse of this, that is, maniacal. Relatively few cases occur during pregnancy as compared with the number of cases occurring during the period of lactation. This, as far as the statistics on the subject in our asylums can be depended on, is approximately one-half of 1 per cent.

This, however, is probably too low as there is a marked repugnance to confining a pregnant woman in an institution, or rather to have the child born in such an atmosphere. In comparison to these statistics, the following statistics cover the puerperal insane.

Haslam,	of 1644 insane cases, gives	84 puerperal insane.
Reid(1),	of 899 insane cases, gives	111 puerperal insane.
Reid(2),	of 703 insane cases, gives	37 puerperal insane.
Palmer,	of 467 insane cases, gives	19 puerperal insane.
Thurnam,	of 246 insane cases, gives	11 puerperal insane.
Charenton,	of 256 insane cases, gives	10 puerperal insane.
Cork,	of 255 insane cases, gives	34 puerperal insane.
Webster,	of 1091 insane cases, gives	131 puerperal insane.
Esquirol(1),	of 1119 insane cases, gives	92 puerperal insane.
Macdonald,	of 691 insane cases, gives	49 puerperal insane.
Guislain,	of 144 insane cases, gives	1 puerperal insane.
Leubben,	of 1184 insane cases, gives	181 puerperal insane.
Esquirol(2),	of 144 insane cases, gives	21 puerperal insane.

Total, 8843

781

This gives an average of 8.83 per cent. If the exceedingly low percentage of Guislain is deducted, the average is raised not quite 1 per cent. higher. In this table Haslam gives about 5 per cent., the asylum of Charenton about 4 per cent., and Leubben about 15 per cent. These discrepancies can scarcely be explained by local differences, and must be due to errors in some of the reports.

Schmidt gives the following table of percentages from more recent observers, including Leubben.

	Per cent.
Leubben (Halle).....	15.3
Furster (Charité').....	16.8
Ripping (Siegburg).....	21.6
Schmidt.....	17.3

Lloyd states: "Some of these results cannot be explained except by peculiar circumstances which must characterize the institutions from which the statistics are taken. It is possible among the poorer and more vicious classes of large cities, where illegitimacy and privation can sometimes make of pregnancy a veritable scourge, that one case of insanity in five may be connected in a more or less remote degree with child-bearing, but this proportion certainly cannot hold among all classes the world over. These figures suggest again the error of attributing to one cause too exclusively the various diseases of the mind and excite the doubt whether other important factors may not be omitted in such an inquiry. Marcé who has made a careful study of statistics, draws the conclusion that there is 1 case of "puerperal insanity" among twelve or thirteen cases of all insane women: this is about 8 per cent. The Pennsylvania Hospital for the Insane has admitted during almost a half century 4442 insane females of whom 360 are attributed to the puerperium and lactation. This large institution draws from the more affluent classes of the whole United States. Its percentage is also about 8. The Norristown Asylum, attributed 141 of its 2100 insane females to child-bearing; about 7 per cent. Tuke's statistics taken from Morningside Asylum gives 155 cases of puerperal insanity among 2181 insane females, 7.1 per cent. From these various figures it appears that of all the hospital cases about 8 out of every 100 female cases are cases with a history of recent childbirth or lactation to which is probably partly due, either as a predisposing or exciting cause, the existence of the mental maladies of these patients."

Obstetricians will naturally be more interested in the second inquiry—the frequency of mental diseases relative to the total number of confinements. It is not possible to present statistics which are

entirely reliable. The attempt to prepare such tables has been made by several authors. Reid gives the statistics of several lying-in hospitals as follows:

Westminster,	3500 labors,	9 cases of insanity.
Queen Charlotte's,	2000 labors,	11 cases of insanity.
St. Giles,	2838 labors,	1 case of insanity.

Here again are obviously several sources of error or difference. The large percentage of the Queen Charlotte's Hospital is attributed to the fact that this institution received a larger number of illegitimate pregnancies than the others.

Macleod has recently made some calculations as follows:

Reid's statistics,	Labors	8,338	
	Insane cases	21 equals 1 to	397.
Ridgen's statistics,	Labors	6,000	
	Insane cases	5 equals 1 to	2000.
Macleod (various sources),	Labors	11,940	
	Insane cases	30 equals 1 to	398.

These three estimates give one case of mental disorder to 469 cases of labor, and no doubt include pregnancy and lactation. Ridgen's table varies widely from the others, and probably makes the average number of insane cases too low. It is noticeable that Reid's and Macleod's results are almost identical, so that the average of about one case in about 400 labors is probably as nearly correct as can be determined.

Symptoms.—The onset of the attack of puerperal mania, when this occurs during pregnancy, is usually slow and insidious. It is hard to draw a distinct dividing line between the peculiarities of conduct and pathological cravings of a pregnant woman of the nervous type from a clear-cut mental alienation. The signs of an impending mental break, however, are often clear enough. The patient usually loses interest in the ordinary affairs of life and there is a tendency for the mind and attention to wander. The patient becomes depressed. There is a tendency to irritability and fault finding until finally there is a clear-cut development into a well-defined melancholia. It may be stated that the general mental picture during this period is depressive in type; while periods of excitement do occur and even in some cases, the whole clinical picture is one of excitement, there is usually back of this marked mental depression, the clinical picture here following the old clinical description of melancholia agitata. While delusions are frequent, they need not necessarily be present. When delusions occur, they are here again usually depressive in type,

often of a neurosexual nature with ideas of infidelity toward the husband, aversion, etc. Occasionally acute maniacal outbreaks are observed and when these occur, they do not differ in the clinical picture from that of acute mania due to other causes. Mental confusion, of sudden onset where the previous mental condition of the patient was normal lead to a suspicion of kidney inefficiency. Where the development is of slow onset with a marked predominance of sexual delusions, not infrequently, we are dealing with a recurrence of a previous mental breakdown in early adolescence. In all events, careful inquiry should be made into the previous history of the patient in such cases. Hysterical irresponsibility and conditions of hysteria with marked nervous irritability, outbreaks of laughing and crying should be carefully differentiated from maniacal outbreaks. These conditions usually clear up rapidly under isolation, suggestion, and a relief from the cares of the household. Isolation, however, should never be practised in the depressive mental type of case, because here it only serves to accentuate and make worse the mental condition. Mental conditions at the time of the delivery are occasionally noted. They were of more frequent occurrence before the general practice of anesthesia to relieve intense pain in prolonged labor. We must assume that in this group of cases, the combination of the pain together with the nervous excitement and shock of delivery, more particularly in primiparæ gives rise to the development of transient mental states. The mental condition here is usually one of delirious excitement with motor excitement. This may, however, be associated with ideas of self-destruction, and in some cases with ideas of destruction of the child, as the cause of the pain and suffering. It is rare for such conditions to be continued over into the lactation period. This mental condition should be distinctly differentiated from that seen in prolonged labor or forceps delivery, extensive laceration, considerable bleeding, shock, and secondary anemia. Here, the mental condition may be prolonged and in some cases, at least, is due to a failure of the reestablishment of a normal blood pressure, insufficient kidney action, and often deficient cardiac action. The mental condition here largely resembles the extensive group of postoperative manias, and is due largely to the same cause. These cases are easily differentiated if recognized by their type, by a rapid disappearance of the symptoms with cardiac stimulation and reestablishment of the normal blood pressure with sufficient elimination from the kidneys.

During the lactational period many factors may be present to

account for the development of mental conditions. We are here dealing with problems of mental disease largely the same as those met with in a general way at other periods of life. The causative factors, however, in the production of the mental state are so often removable, if recognized, that the prognosis in this group is better than those seen in mental diseases due to other causes. The mental picture will naturally depend largely upon the causative factors at play. When we are dealing with women who have had preliminary nervous breakdowns during adolescence, a pre-dementia precox, so-called, the tendency of the mental condition is to progress to a terminal dementia, in contradistinction to the tendency to recover when such a degenerative condition does not exist. When the intoxication of an underlying syphilis is at fault in other cases, the mental picture assumes the type of general paresis.

When the mental condition, however, is due to a combination of causative factors, bad nutrition and bad hygiene during pregnancy, insufficient care during labor, the reassuming of the household burden too early, nursing the child, all of these are calculated to produce the mental picture spoken of as manic-depressive insanity, either a condition of mania or one of melancholic depression and in some cases with an alternation of these two types. Malnutrition with nervous exhaustion, more particular when associated with suppurative conditions and anemia may produce a condition of hallucinatory delirium. The chronic reflex factors, more particularly in the distribution of the pelvic organs are prone to produce a chronic delusional state and to prolong what would otherwise be a relatively short mental disturbance. Bevan Lewis gives the following classification of the mental conditions under his observation.

FORMS OF MENTAL AILMENT.

	Lactational	Puerperal
Simple mania.....	6	7
Acute mania.....	18	31
Acute delirious mania.....	1	00
Mania with prominent delusions.....	11	7
Recurrent mania.....	3	00
Dementia with excitement.....	1	00
Simple melancholia.....	3	8
Acute melancholia.....	3	1
Melancholia with prominent delusions.....	17	14
Melancholy with stupor.....	00	1
General paralysis.....	2	00
Congenital mental defect.....	1	000
Total.....	66	69

Prognosis.—The prognosis in this type of mental disease is perhaps better than in almost any other class of mental disease. It is admitted by all observers that even under unfavorable conditions, the general tendency is toward recovery, and in the degenerative groups such as dementia precox and paresis, both of which are not in the strict sense of the term, insanities of pregnancy, the prognosis is naturally unfavorable.

In many cases where dementia precox develops, a previous attack of mental disturbance has existed and the patient is to a certain extent forced by the family into the marital state on account of hypersexuality or sometimes with the idea that pregnancy and child-bearing will prevent a recurrence of the previous mental disturbance. Development of paresis is purely accidental, a preexisting syphilitic intoxication acting in conjunction with the intoxication of pregnancy to precipitate a paretic disturbance. The following analysis of the cases in the Philadelphia Hospital for the Insane made for me by Dr. A. J. Ostheimer, gives not only an idea as to the curability of the diseases and its short duration but likewise a progressive decrease in the instance of the disease in the last fifteen years.

Total number of women admitted to the Philadelphia Hospital for the Insane 1905 to 1914 inclusive was 3600. Of these 129 were suffering from puerperal insanity, that is, 3.6 per cent. of all insane cases occurring in women.

The number is gradually decreasing as is seen from the following table:

Year	Total admission	Puerperal insanities
1905	355	22
1906	378	17
1907	434	14
1908	402	16
1909	423	18
1910	433	18
1911	410	7
1912	411	8
1913	150	2
1914	204	7

Out of 114 cases, there were 83 recovered, 20 became chronically insane and 11 died of intercurrent affections, *i.e.*, about 73 per cent. recovered, 17 per cent. became chronically insane and 10 per cent. died.

Of the eighty-three cases discharged as restored one was discharged within one day, one in three days, one in one week, one

in two weeks, two in three weeks, one in one month, five in two months, seven in three months, thirteen in four months, eight in five months, eleven in six months, ten in from six to nine months, four in from nine to twelve months, eight in one year, five in two years, one in three years, three in four years and one after five years.

Treatment.—The treatment of the mental conditions in puerperal insanity is largely one of a correct diagnosis and the removal of the causative factors. The statistics in connection with the Philadelphia Hospital indicate in recent years a very marked tendency to reduction in the instance of puerperal insanity. This may be attributed to better practice in obstetrics, to a more scientific care of the pregnant woman, or discovery of the underlying causative factors, together with complete knowledge of the pelvic conditions following pregnancy. The treatment naturally will be the local treatment of a sick person and not of the mental state.

A favorable diagnosis has been repeatedly shown to be in direct proportion, both as to the percentage of cures and the time taken for cure, to the time elapsing before the patient is received into an institution and placed under proper treatment. Not that I would urge the incarceration of such a patient in an institution for the insane. If anything, it has a deleterious influence on the course of the disease. It is better, however, to have the patient properly cared for and nursed in such an institution than that they should receive no treatment or that treatment should not be properly directed at home. Proper treatment instituted early and with the attention directed to the nervous and physical ailments concerned give better results than if the patient is transferred to an institution. I have indeed removed such cases to their own homes with prompt and beneficial results. Better even than this method of treatment is the proper treatment of the patient in a well-directed hospital where the patient is treated as any other ill person would be treated for other diseases. A sane handling of mental conditions will never obtain until a general hospital has a psychopathic ward for the study and treatment of acute mental conditions.

THE CESAREAN OPERATION; ITS WIDER APPLICATION; WITH REPORT OF CASES.*

BY

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AFTER the introduction and establishment of antiseptics, and later asepsis into the practice of surgery, its application to obstetrics was devoted for the most part to efforts at sterilizing the birth canal. Not only when some operative measure was employed, but also in the natural process of labor, antiseptic douches were given. Time and experience led to the early abandonment of the latter practice, and the great gains to the obstetric art were for the most part confined to the application of the principle of cleanliness to whatever procedures had been in vogue up to this period.

The Cesarean operation done at first only on dead women to quickly rescue a living baby, and for the past three centuries on living women who presented some insuperable obstruction in the birth canal, has rarely been resorted to before the present century for other causes than obstruction due to deformities of the bony pelvis or tumors of the soft parts. Emboldened, however, by the experience of the gynecologist who showed that the peritoneal cavity and the uterus itself could be opened without great risk, the obstetrician began to resort more frequently to the abdominal operation for delivery. From March, 1835 when Professor Gibson of the University of Pennsylvania did the first successful Cesarean operation ever done in Philadelphia, and about two and one-half years later repeated the performance successfully on the same patient, until 1880 no successful operation of this kind was done in Philadelphia. In this year Dr. Elliott Richardson did the Porro operation successfully. Dr. Gibson's operations were done before the days of ether, and the wound was not sewed up.

In 1882 Säger announced his improved technic for the operation which included sewing of the wound and bringing the peritoneal surfaces together; and from that event the modern classical Cesarean section dates. It was about this time also that general surgical

* Read at a meeting of the Philadelphia Obstetrical Society, March 4, 1915.

technic began its rapid strides due to the introduction of Listerism, and as laparotomy became less hazardous and hence more popular, obstetricians began to think more along surgical lines. In 1888 Dr. Howard A. Kelly did a classical Cesarean section on a woman with an external conjugate of 15 centimeters who had been in labor two weeks and whose bag of waters had broken four days before operation and saved both mother and child, the first to recover in Philadelphia since Dr. Gibson's notable case. From this time forward operations became more frequent, but they were done chiefly for some obstructive cause, and too often, as in this case, undertaken as a last resort thus leading to a high mortality. When it was realized that section of the pregnant woman was a very safe procedure, if done before she was infected by examinations or had spent herself in fruitless labor, the operation entered upon a new era, and the rights of the unborn child came to receive a consideration not heretofore accorded it. So from this time forward the Cesarean operation was rapidly adopted where formerly the child would have been destroyed, as in cases where tumors, ovarian or fibroid in the pelvic cavity, or cancer of the cervix, rectum or vagina or bony deformities obstructed the birth canal, and also where marked disproportion existed between the passage and passenger.

The mortality of this operation, which up to 1881 was $58\frac{1}{3}$ per cent. according to Harris' statistics of 120 operations done in the United States, has grown steadily less, by reason of improved technic and earlier operation, until the present time, when it may be said to be on a par with abdominal section for any other cause. That is to say, in selected cases and in competent hands the mortality should be about zero, the operation *per se* being quite free from risk; but, of course, our patients do not always present themselves to us in this much to be desired condition, but are brought into the hospital after being in labor many hours and even days under the care of a midwife, and oftentimes after unsuccessful efforts at delivery by physicians, and are in consequence poor subjects for surgery. A 10.7 per cent. mortality in 571 abdominal Cesarean section has recently been reported by Dr. Davis of the New York Lying-In Hospital where cases good and bad are received. It is not unreasonable to assume that this 10.7 per cent. mortality, *i.e.*, sixty-one deaths could have been reduced to 1 or 2 per cent.—if not entirely abolished—if these patients had been attended in the first place by a competent obstetrician who would have foreseen the troubles, and by timely interference ended them. Here is

a rich field for an educational crusade, such as has been conducted with respect to appendicitis and tuberculosis. The laity should be taught that the risks attending parturition can be, for the most part, avoided by intelligent oversight of the parturient; by preparedness for rendering aid when needed, no less than by masterly inactivity when normal.

There is at present a growing tendency to broaden the indication for the Cesarean operation. Measured by the rule that that method of delivery which offers best chances for both mother and child shall be adopted, one will in these days more often than hitherto resort to section rather than delivery through the natural passages. I hasten to qualify this statement by saying that this presupposes a surgical training and proper environment for clean surgical work; and is therefore largely a subjective question with the accoucheur. Included in this class are certain placenta previas, eclampsias and high forceps cases. Take for instance an eclamptic, at or near term pregnant for the first time with an undilated birth canal, an unobliterated cervix and a living baby. Its delivery can be accomplished, in my opinion, more speedily and safely and with less violence to the mother's tissues, if not less shock by section, than by forceful dilatation of the natural passages. Experience only will establish this and this is in process of making.

And so with placenta previa, if the placenta be centrally implanted, and the child viable, or better near term, we will surely be able to save many more babies and perhaps more mothers by section than by any method yet devised through the natural passages.

As to high forceps operations, who of us has not felt, after this difficult procedure, especially in primiparæ, resulting in paralysis or perhaps death of the baby in delivery, and deep laceration of the mother's soft parts that it would have been better to subject the mother to a slight risk by section—surely not greater than that due to violence done by high forceps, with considerable certainty of getting a live and uninjured baby, and a clean wound in the mother?

Following is the report of nine Cesarean sections done during the past year.

CASE I.—*Mrs. W., flat pelvis, section, resulting in live baby and recovery of the mother*—was admitted to the Kensington Hospital for Women Jan. 20, 1914, and operated upon Jan. 22, 1914. Her first labor which lasted twenty-eight hours was terminated by the use of forceps during which the symphysis ruptured with a loud report, according to her physician's statement, and separated

about an inch. The baby weighed $8\frac{1}{2}$ pounds and suffered from hemiplegia following its birth, from which it recovered in about two months. The mother was confined to bed six weeks, and on arising felt as if she was falling apart, and had great disability in walking, in spite of the pelvic support which she wore for six months or more. She suffered for a long time with pain in the symphysis and back, and for four months after labor had incontinence of urine. When, after two years and seven months she found herself again facing the problem of delivery, she naturally dreaded the ordeal very much, and begged for relief by some other method than the threatened forceps delivery; so she was admitted to the hospital two weeks in advance of term for the purpose of inducing labor, the head being movable above the brim. However, after discussing the situation with her physician (Dr. Galbraith) and husband, and herself, the Cesarean operation was elected and performed Jan. 22, 1914. The patient made a good recovery and went home in two weeks and suffered none of the disabilities and invalidism that followed the previous labor.

CASE II.—*Mrs. D., nephritis with marked edema and cough—section resulting in live baby and recovery of the mother*—was admitted to the Kensington Hospital for Women, March 11, 1914, with blood pressure of about 200 mm., extensive edema of the legs and face, skin of marble hue, mental dulness, headache and scanty urine containing albumin and numerous granular casts. Her condition improved considerably in a week by the use of a milk and buttermilk diet, purgation and baths. The urine, however, continued scanty, the twenty-four hours' output for the 15th, 16th, 17th and 18th being 12, 25, 15 and 26 ounces respectively, and after a distinct gain during the first few days after admission to the hospital, she began again to lose ground even under strict treatment; so on the 19th it was decided to bring about delivery even though no convulsions had occurred. Inasmuch as she was a primipara with breech presentation as determined by abdominal palpation, abdominal section was elected in preference to induction of labor through an undilated birth canal. Owing to her cough chloroform was employed as an anesthetic and a 10-pound baby quickly delivered. After the uterus was emptied it was observed that there was a marked projection of the sacral promontory, which would have greatly increased the difficulty of delivering a 10-pound baby, presenting by the breech through the natural passages. Her operative recovery was uneventful. Her general health, I am told by her physician, has been poor, owing to her nephritis.

CASE III.—*Mrs. S., Polish. Eclampsia—section resulting in a stillborn baby and recovery of the mother*, was admitted to the Episcopal Hospital, Feb. 25, 1914 and discharged March 25, 1914. She was pregnant about nine months and during gestation had been habitually constipated, suffering during the early months with nausea and vomiting, and during the last four months with headache in the mornings and during the last two weeks with head-

ache constantly. No treatment relieved the headache. She went into labor at 11 P. M. and at 1 A. M. had her first convulsion. Before she was admitted to the hospital she had had seven convulsions, one occurring in the ambulance. On admission she was edematous and examination showed her to have a small, nulliparous vagina, a relatively hard and undilated cervix. The baby's head was freely movable at the inlet and the bag of waters unruptured. Fetal heart sounds were not heard. On account of the undilated birth canal, the unruptured membranes and the freely movable head, delivery by section instead of through the natural passages was decided upon. The patient was given ether, the vagina cleansed, the cervix painted with tincture of iodine, and iodoform gauze inserted into the vagina. The abdomen was prepared by the benzine and iodine method. A median incision large enough to turn out the uterus was made and a stillborn child was delivered. The patient made a good recovery.

CASE IV.—*Eclampsia resulting in a live baby and recovery of the mother.* Mrs. H., aged nineteen, primipara, admitted to the hospital Feb. 7, 1914 pregnant eight and one-half months. The patient states that she was well during gestation, the kidneys were active and she was free from headache. The onset of the illness was sudden. She was brought into the hospital in the ambulance in convulsions with a pulse of 138, respirations 38 and temperature 100.2. She was markedly edematous, especially the vulva. Examination showed a nulliparous vagina an undilated cervix and a live baby. Wherefore delivery by section was decided upon in preference to forced delivery by the natural passages. The result was a live baby and a live mother, whose convalescence was partly febrile.

A considerable amount of ascitic fluid was found in both of these eclamptic cases and none in the others.

CASE V.—*Nephritis, cardiac dilation, edema of the lungs. Section, followed by death of mother and baby.*

Mrs. G., aged twenty-four, primipara, admitted March 10, 1914 and died March 12, 1914, pregnant eight months, has suffered a great deal throughout her gestation from headache and constipation. Ankles and eyelids are edematous. For the past three weeks has been very short of breath, with cough and expectoration of a mucoid material. This morning she grew suddenly worse. She could not lie down; she became deeply cyanotic, and was constantly coughing up a frothy and bloody mucus, which was her condition on admission. The respirations were rapid and labored, the vessels of the neck engorged; the pulse very rapid, irregular and weak; the right heart was dilated and moist râles were audible all over the chest. Twenty ounces of blood was withdrawn at once from the median basilic vein, and atropine, gr. $\frac{1}{150}$, strychnia, gr. $\frac{1}{30}$ and camphorated oil, ℥ xx., given hypodermatically followed by some relief. Prompt delivery of the baby was regarded as imperative, and owing to the primiparity of the mother, section was decided upon as the quickest method of delivery. Morphia gr.

$\frac{1}{4}$ was given hypodermically, and the section done under local anesthesia for which Schleich's solution was employed. The abdominal incision only required an anesthetic. For the uterine incision no anesthetic was used or needed. A well-developed baby with pulsating cord was quickly delivered, but the assistants, in spite of faithful efforts could not succeed in establishing respiratory action. A large quantity of serum escaped from the baby's mouth and nose during the efforts to induce respiration, showing that it is probable that this infant sucked amniotic fluid into the bronchial tubes by intrauterine respiratory efforts, stimulated by the blood highly charged with carbon dioxide which was furnished to it. Thus the baby appeared to be literally drowned in amniotic fluid. Following the operation which was done about midday the patient was quite comfortable, with improved pulse, able to lie flat and relatively free from respiratory difficulty. Although pallid and waxy in appearance, her improved condition seemed to justify the hope that she might recover. She, however, passed only 2 ounces of urine during the first eighteen hours after operation, but 17 ounces were passed during the next eighteen hours; the abdomen became more and more bloated, the bowels resisting all measures for their evacuation. Toward evening nausea supervened, for which the resident physician passed the stomach tube, whereupon the patient had a convulsion and died about thirty-six hours after delivery. Her urine boiled solid with albumin and was loaded with granular casts.

Just how much effect the preliminary hypodermic injection of morphia had on the baby's respiratory function and in retarding the action of the mother's bowels can only be a matter of conjecture but it is the one feature in reviewing the case which I should like to omit.

CASE VI.—*Placenta previa. Section followed by recovery of the mother and death of the baby.* Mrs. D., aged thirty-six, married, six children and two miscarriages, admitted to the Episcopal Hospital March 20, 1914, pregnant nine months. Gestation was normal until the end of the eighth month when she began to bleed. The hemorrhages were small at frequent intervals, not attended with pain and without any known cause. On the night of admission, the patient had had an enormous hemorrhage, losing about 3 pints of blood. The attending physician packed the vagina without completely arresting the hemorrhage. On admission the examination showed the cervix partly dilated and occupied by the placenta. The fetal head was not engaged, but was freely movable above the pelvic inlet. The bag of waters was intact and the fetal heart sounds feeble if heard at all. On account, therefore, of the placenta previa, the floating head and possibly live baby, delivery was undertaken by abdominal section. Owing to the shocked condition of the patient, the pulse being 144, the presence in the lungs of râles and impaired resonance in the apices, nitrous oxide was given for the skin incision and for inserting the skin sutures. All other details of the operation were conducted without an anesthetic, the uterine manipulations causing no pain except where the organ

was dragged upon. The baby's cord pulsed on delivery, but soon ceased; its respirations were never established. The patient made a mildly febrile convalescence, developing a superficial stitch abscess. Her abdominal preparation was made on the table by the benzine and iodine method.

CASE VII.—*Contracted pelvis. Cesarean section, recovery of the mother and death of the baby.* F. G., aged twenty-eight, admitted to the hospital Feb. 27, 1914, has provided for the surgeons a veritable mine of abdominal pathology. Her first labor about one year after coming to this country was terminated by the use of forceps. The baby lived only about two weeks. In October, 1910, she had a gastroenterostomy for gastric ulcer done by Dr. Charles H. Frazier. In June she had a Cesarean section done by Dr. E. P. Davis, resulting in a living baby. Following this section the patient had pain and a constant discharge from the vagina. In September, 1911, she was curetted and had no menstrual flow after that until February 6, 1912. She then conceived and throughout the period of gestation she had numerous fainting spells, when everything got black before her eyes and she would fall down; attacks of cardiac palpitation lasting several hours occurred. These symptoms increased after the fifth month. Labor pains began before admission to the hospital and on the morning of the day of admission became very severe. Examination on admission showed the cervix obliterated, the os dilated to the size of a silver dollar, the head not engaged but floating freely in the abdomen; the fetal heart sounds audible, rate 140. Cesarean section (her second) was done and the patient delivered of a living baby with a large hydrocephalic head, double harelip and cleft palate. It lived only a few minutes. It was noted that omental adhesions to the uterus were general. The uterine incision in this instance was sutured with chromic gut, three interrupted linen sutures and one continuous linen suture to close the peritoneum. This was an emergency operation, and it may be that the abdominal preparation was not satisfactory. At any rate the stitches became infected, and in the course of the next few months, one after another of them came out and in the course of time two hernias developed in the line of incision. Her health, however, was good except for abdominal pains and in due course she became pregnant for the fourth time, and pleaded for an abortion. I prevailed upon her, however, to let nature take its course, promising at the next delivery to remove the organs so that she could not conceive again. She suffered throughout her gestation with abdominal pain, and two weeks before her estimated term was brought into the hospital in active labor and prepared for her third Cesarean section. At the operation considerable adhesions had to be dealt with although they were neither so dense nor so extensive as one would expect from the antecedent history. The uterus was delivered through a long central incision and an opening made in its posterior face to avoid the placental site. The baby proved to be poorly developed, small in size and not of healthy appearance. It was with difficulty

made to breathe and lived less than an hour. The operation was completed by doing a supravaginal hysterectomy, leaving in the only ovary that was found and closing the abdominal wound after excising the hernial sacs. She made a good recovery and has since been enjoying better health than for some years before.

CASE VIII.—*Contracted pelvis. Section resulting in recovery of the mother and living baby.* A. K., Polish, aged thirty-two, married. No previous pregnancies. Labor pains started at 10 P. M., November 25, 1914 and continued until 2 P. M. when the membranes ruptured and from that time until admission to the Episcopal Hospital the following day, the pains were less frequent and severe. Internal examination about midday showed the cervix well dilated but the head not engaged. External examination showed the back to the right, the heart sounds below the umbilicus and the head movable above the brim. Delivery by section rather than by high forceps was undertaken at once; and in view of vaginal examinations having been made both outside and in the hospital, the transperitoneal or extraperitoneal method was employed, and a 9½-pound baby delivered. Baby and mother did well—except the mother had wound infection late, either due to her scratching the wound—or to hasty preparation (by the iodine method) of the abdomen.

CASE IX.—*Flat and contracted pelvis. Section resulting in live baby and recovery of the mother.* A. B., aged twenty-eight. Married five years, pregnant the third time. At her first labor she was attended by a midwife, who after failing to deliver her called in a physician. By a difficult forceps operation he succeeded in delivering a baby which was so much injured that it lived only a short time. At her second confinement she was in labor twenty-four hours before admission to the Episcopal Hospital—unsuccessful efforts at delivery with forceps having been made by her physician. Here, I succeeded with great difficulty in extracting a dead and somewhat macerated fetus. So I advised her to never again have a baby at term delivered by the natural passages. She promptly conceived a third time and her confinement was dated for September 1. She came to the hospital a week in advance of this date and soon after admission the bag of waters broke before the onset of active labor pains, and with the head still freely movable above the pelvic brim. On the following day, I delivered her by the classical Cesarean operation and secured a healthy 7¼-pound baby. The mother's convalescence was uneventful.

To summarize briefly these nine operations resulted in eight living mothers and five living babies—a record which if the operation were undertaken in the interest of the baby would render the procedure unjustifiable. This, however, was not the case. The mother's interest was paramount and the operation was thought to afford the quickest and safest method of delivery of the mother regardless of the baby's condition (in four of the cases).

When it was done deliberately for a contracted pelvis in a well patient, it was with a view to getting a living and healthy baby. One would not subject a healthy mother to this operation if her baby were known to be dead or dying. It would be better to mutilate the baby and remove it through the natural passages.

Whether the morbidity and mortality following this radical method of dealing with these cases is justified, only the accumulated experience of a large number of operations and different operators will show—and toward that, this report is an humble contribution.

MITRAL DISEASE AND GESTATION.¹

BY

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WHILE there is a general impression that gestation and labor in valvular heart disease may progress through its entire course and end without unusual incident or accident, the following cases indicate the occasional, if not frequent, seriousness of this complication. The patients became the subjects of decompensation and, as each one had special points of obstetric interest, I shall report them in brief but necessary detail.

One point of common interest to be more fully developed later was the very practical value of drug narcosis in the management of every one of the three. As one of the women developed a psychosis early in the seventh month, growing progressively worse, opportunity is offered to emphasize the favorable influence of morphine-scopolamin on the mental, as well as the physical, condition of these patients.

CASE I.—Mrs. S. Roman Catholic. Aged thirty-one.

Family History.—Both parents dead, the mother dying in the patient's infancy.

Personal History.—Married three years. She had typhoid at nineteen. This was followed by tonsillitis and rheumatism. Her menstrual life began at about this time, periods occurring every three to four weeks and lasting three days, not painful.

She came under my observation when four months enciente. I found a loud rough apex murmur, presystolic in time, heard over a small area, not transmitted—a mitral stenosis. At the time her pulse rate was 96. Ten days later, under the influence of rest in bed, it had dropped to 80, with systolic pressure 98, diastolic 58, pulse pressure 40. A month later she had developed a hacking

¹ Read before the Philadelphia Obstetrical Society, March, 1915.

troublesome cough, although resting in bed. Her pulse rate was 96. Later there was spitting of blood. Early in the seventh month she developed hallucinations, imagining she heard a number of people just outside her door talking about her. She jumped out of her bed and became excited and much agitated. At other times she was depressed, crying, "I am going crazy" and complaining of sparks before her eyes. She had occasional albuminuria, and once glycosuria. Her psychosis grew rapidly worse, so that it was no longer possible to keep her at home. On January 25, she was admitted to the Hospital. Obstetrically, her condition was as follows: Fetal heart tones 144, in left lower quadrant; external os patulous; and the internal, just fitting the finger tip; systolic pressure 102, diastolic 60, pulse pressure 42; umbilical girth 84; pelvic girth 84; pubis to fundus 27, to ensiform 36. She was approximately in the thirtieth week of gestation. The period of fetal viability had been attained.

A large rectal bougie was introduced at 6 P. M. under hyoscine 1-100, morphine $\frac{1}{4}$ grain—seminarcosis. While her mental condition during the twenty-four hours in the hospital preceding this had been troublesome and annoying to the other patients in the ward, she was now quieted and manageable and so remained while under the influence of hyoscine and morphine. At the end of eighteen hours, her labor, in spite of $\frac{1}{4}$ c.c. doses of pituitary at two- to three-hour intervals had come to a standstill with a cervical dilatation the size of a dollar. A Hirst medium-size bag was introduced and after remaining *in situ* some hours, the dilatation was manually completed and a full dose of pituitary extract was given. The head had come down to the perineum in brow presentation and was extracted by forceps. Twice during these manipulations ether was given by the drop method. Cyanosis quickly became alarming and the ether had to be discontinued. A $4\frac{1}{2}$ pound living baby was born. As the effect of the drugs passed off, the patient's mental state grew bad, and it was not possible to keep her in bed without restraint or without hyoscine and morphine. During the next four days she was kept quiet, at intervals by repeated hypodermics of these drugs. On the fifth day, she had a temperature of 105. On the same day she died of pneumonia, probably of embolic origin.

CASE II.—Mrs. O., aged thirty-one.

Family History.—Mother living—aged seventy—in Russia. Father dead, aged eighty-five, old age; two brothers living and well; one sister, forty-five, nine children, no complications at delivery. No history of cardiac, renal, carcinoma or tuberculosis in family. Mother had seven children, four living; had one stillborn child; had one set of twins, and at age of six months both died of measles.

Personal History.—Born in Russia, thirty-one years ago, remembers having had measles, did not have diphtheria, whooping-cough, typhoid, scarlet fever; states that she never had rheumatism. Menses began at age of sixteen, regular, lasting three days, non-painful, no abnormal amount. Married at age of twenty-two, and one year later gave birth to male child, and did not have any compli-

cations of pregnancy, the child being born without instruments, the patient out of bed in one week. The pregnancy was healthy with no toxemias. The second child was born three years later, also without instruments, but it died of a growth in the neck. One year later she had a premature birth at eight months, the child dying. This she attributes to hard work. One year and three months later, another premature birth at six months, child dead. Two years later had twins; one of the children was dead and the other lived six days. She lost much blood.

Her last period occurred in July, 1914. I saw her first in October, the third month, her main complaint then being cough and dyspnea on exertion. This cough was of cardiac origin. She was extremely anxious to bear another child. She was sent home, directed to rest and given cardiac tonics.

From December 22 to January 8, 1915, she spent at the hospital in bed. She had severe cough with expectoration, especially in the morning. Her pulse rate at rest was 96; systolic pressure, 112; diastolic, 70; pulse pressure, 42; phthalein test, first hour 33 per cent., second hour, 8 per cent.; Wassermann, 0. The fetal heart was located below the umbilicus. There was no edema. The urine was abundant, normal in color, specific gravity, 1020, a trace of albumin. She was entirely free from all abnormal enlargement and swelling. On February 12, five weeks later, she returned to the hospital, her condition in marked contrast to that on leaving—water logged, she was not able to lie down, and her heart action was rapid and bad, evident decompensation. She was at the end of the seventh calendar month. Her umbilical girth was 106 cm. She presented a picture of extreme distress, and her anxiety for her child's life now gave way to a willingness to accede to anything we might suggest for her own relief.

Puncture of the amniotic sac gave exit to a small amount of fluid, to our great disappointment. A large rectal bougie was allowed to remain. As her labor pains grew more frequent, her dyspnea increased. Later her condition grew alarming with respirations at 60 per minute and heart action correspondingly bad. By thoracentesis, 28 ounces of fluid was withdrawn from the left pleural cavity, and this produced slight alleviation. The relief gained by the subcutaneous use of scopolamin, morphine and narcophin was positive. During five hours she had mg. $\frac{3}{4}$ scopolamin, mg. $\frac{1}{4}$ narcophin and gr. $\frac{1}{8}$ morphine.

Eighteen hours after the introduction of the bougie, a small $3\frac{1}{2}$ -pound girl was still born. As we had suspected, there was a second child and puncture of its amnion, gave exit to a large amount of fluid. It was a vertex presentation, the head rapidly coming to the inferior strait, when progress ceased. By the use of forceps, and moderate traction, the baby was quickly delivered—living, but edematous. Its trunk resembled a foot-ball. All of its serous cavities were filled with fluid of similar character and appearances, to that withdrawn from the mother's left pleura. This baby, a boy, made a few feeble respirations only.

Her puerperium was uncomplicated and afebrile. Swelling of the lower extremities rapidly disappeared as did the ascites and hydrothorax. Now, a little over three weeks, she is thin and pale, but feels well and is extremely anxious to go home. A cough and the characteristic murmur of mitral stenosis persist.

In passing, I want to pay tribute to the heroic character of the Russian Hebrew mother, whose daily thought was not of herself, but of her child. Her deep innate instinctive maternal feeling was as strong a bar to the consideration of therapeutic abortion as the *ex cathedra dictum* of the church in the first case.

CASE III.—Mrs. M. S. Therapeutic abortion at the end of the second month. Aged twenty-eight. I am indebted to Dr. Wm. E. Robertson with whom I saw the patient, for the following notes.

Family History.—Unusually bad. She was one of eight children, four of whom died of convulsions before the eighth year of age. Of the remaining four, two are epileptics, one only being apparently normal. Father was one of twelve children, eleven of whom were confirmed alcoholics and their parents before them. On the mother's side the grandfather was also an inveterate drinker. The patient insidiously developed a mitral stenosis, and as is often the case in this type of lesion, no etiologic factor could be determined. It was discovered during an attack of broken compensation. She had previously had two children without evidence of embarrassment.

Owing to the extreme nature of the loss of compensation, she was told the dangers of subsequent pregnancy, and later upon becoming pregnant, interference was deemed justifiable owing to the fact that dyspnea, pulmonary congestion and hepatic enlargement occurred from time to time on slight provocation. Her condition seemed to forbid the use of a general anesthetic, at least such as ether or chloroform, as thrombosis or embolism in such cases is prone to develop.

The uterus was dilated and emptied under the influence of a hypodermic of one-fourth of morphine, without subsequent ill effects. The cardiac condition gradually grew worse and a little over a year later she died after an illness of several weeks, toward the end of which she developed numerous pulmonary infarcts.

The necropsy revealed an advanced mitral stenosis with hypertrophy of the left auricle and the right heart, with extreme dilatation of the right heart. Also an involvement of the aorta-mitral area of Huchard, with consequent double aortic lesion, a very common finding in mitral stenotics who have lived over a number of years. Both lungs were congested and contained numerous infarcts of the hemorrhagic type. There was passive congestion of the abdominal viscera, including considerable enlargement of the liver and spleen.

Therapeutic abortion, the treatment adopted in the last case, would obviously have been correct for all. The endeavor to carry these patients over months of increasing circulatory burdens to the period of fetal viability by rest and cardiac tonics after serious symptoms have developed is prone to spell disaster. In the face of

decompensation, or impending decompensation, there remains but one thing—and that is, empty the uterus.

I wish to emphasize the ease with which this can be done under the influence of narcosis by the subcutaneous method. Morphine sulph. gr. $\frac{1}{4}$ and atropin sulph. gr. 1-100, the suggestion of Dr. Robertson, proved quite satisfactory in this particular individual.

This case occurred eight years ago. I have since then employed the same method in many cases of incomplete abortion and I would briefly detail the following technic, which serves me well: Morphine-hydrobromide, gr. $\frac{1}{4}$, hyoscine (or scopolamine) hydrobromide, gr. 1-100, one hour before the operation; at the same time, 1 ounce of whiskey in the form of punch may be given (if the patient have conscientious scruples, give an equivalent amount of alcohol, well diluted, by enema); occasionally a second hypodermic of 1-200 hyoscine is given fifteen minutes before the operation—forty-five minutes after the first injection. The patient is blindfolded. All is kept quiet. Your patient will remain asleep, provided you have her full confidence and operate deftly.

The *bad* immediate and remote influence of ether was manifest in Case II, and equally manifest was the *benign* effect of hyoscine and morphine.

The charge against scopolamin and hyoscine in the seminarcois of labor as a cause of puerperal insanity deserves attention. It is deplorable that it has been introduced into the daily press. The widespread popular discussion of this entire subject of "twilight sleep" has produced an unhealthy mental state in the community at large. My own cases—including those of "twilight sleep," of which my list now numbers 110, and those in which a more profound degree of narcosis was induced for purposes of curettage, dilation of the uterus, etc., or as a precedent of local infiltration given before ether—now number 200. During the period covered by this particular method of operating, I have seen two cases of insanity—one in addition to that reported—and one postpartum neurasthenia. Case I lost her reason a month before she ever had any of the drugs—and, fortunately, the other two never had either hyoscine or scopolamin in any manner or form.

In a word, the influence of these drugs, given during labor, under proper environment, has been uniformly beneficial to the postpartum mental and physical condition of these women. Said the neurasthenic woman, "Doctor, why did you not give me "twilight sleep?" "If you had, I would not be so unhappy now." And I am inclined to believe she was right.

SHOULDER PRESENTATIONS, WITH REPORT OF
THREE CASES.*

BY

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THE occurrence of three cases of shoulder presentation in private work within a comparatively short time, and the development of unusual complications in one of them, has prompted the report of the cases.

The recognition of a case of shoulder or transverse presentation at once introduces one to an obstetric complication. The degree of danger produced varies, usually, directly as the length of time of the existence of the condition prior to its recognition, and the treatment must be adapted to the conditions that have developed since the occurrence, or governed by the factors that favored the possibility of such an unusual presentation.

The conditions that combine to produce transverse or shoulder presentations may be inherent in the uterus, consisting of developmental anomalies, which, by alteration in the shape of the organ prevent the assumption, by the fetus, of the longitudinal position. Naturally, such permanent uterine asymmetry will predispose to the repetition of this complication in succeeding pregnancies. At the same time the knowledge of the existence of such deformity will place the accoucheur upon his guard, and enable him to adopt preventive treatment to lessen such tendency or to institute active treatment immediately that labor sets in, if the retention of the transverse position by the fetus has not been preventable.

Again, the conditions within the uterus favoring the transverse position may have developed as a consequence of multiparity, with overstretching of the uterine and abdominal walls, allowing distortion of the uterine shape and reducing the lateral support of the fetus, or be the product only of factors developing during the individual pregnancy, such as polyhydramnion, small size of the fetus, overgrowth of the fetus or monstrosity.

Conditions outside the uterus such as adhesions, particularly those resulting from ventrofixation, may be the predisposing factors; and

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anomalies in pelvic development, or tumor masses, may prevent normal engagement, and as labor progresses tend to the development of a shoulder presentation.

Occasionally the condition may develop as a complication resulting from attempts to induce labor, as happened in one of the cases about to be reported, and as happened in another case of which I have personal knowledge, where a Pomeroy bag was the offending instrument.

The method of treatment of transverse positions, consisting essentially in the production of a polar position, will depend on whether the patient be seen before or after the labor has started; and if not seen until labor has begun, on the stage of cervical dilation and on the integrity of the membranes.

If the patient be seen before labor has started, attempts to secure a longitudinal position by external manipulation should be made, and the resumption of the transverse direction hindered by the use of lateral pads and a girdle. Such prophylactic treatment can be but rarely applied, and is probably even more rarely successful.

The usual occurrence is the discovery of the malposition after labor has started, and frequently not until the membranes have been ruptured. If we are so fortunate as to see the patient before rupture of the membranes, every effort should be made to preserve these structures until dilatation has occurred (this is best done by the use of a *colpeurynter*), and external version should be attempted, with the object of bringing the fetal head over the inlet. It is apparent that careful investigation should be made of the pelvic measurements and fetal size, for if the transverse be due to such marked pelvic deformity as to prevent engagement, or due to the presence of an obstructive tumor, then radical methods of delivery should receive prompt consideration.

If the performance of an external version be unsuccessful, the preservation of the membranes by bag support will allow of normal cervical dilatation, and the preparation of the parts for the internal version necessary to the safe termination of the case.

If the membranes have already ruptured, the course to pursue will depend on the degree of cervical dilatation, and on the amount of fetal impaction that has been produced.

If the patient be seen early, and sufficient dilatation to admit of the introduction of the hand has already taken place, an immediate podalic version will give control of the situation. If the required amount of dilation has not already taken place, it must either be done manually, or probably better by methods more nearly simulat-

ing the normal—namely, the introduction of a bag into the cervix. Such a measure avoids the traumatism resulting from rapid manual stretching, and prevents impaction occurring while waiting for dilatation to take place.

With those cases termed neglected shoulder presentations, fortunately growing less frequent, the amount of impaction and particularly the condition of the lower uterine segment demand chief attention. The question that demands consideration is as to whether the condition of the lower uterine segment will allow of the intra-uterine manipulations of a version. If the impaction be not extreme, if the child be alive, and if the absence of the retraction ring make it quite probable that version can be safely done, that operation may be undertaken. Where, however, there is doubt as to the condition of the lower uterine segment, the consideration for fetal life should not be given much place and where in other cases the presence of the retraction ring shows without question the grave condition of the uterine wall, the doing of a version should not be attempted but an embryotomy be done, distasteful as it is.

The consideration of such a procedure as Cesarean section in such conditions is out of place, because cases such as those just mentioned offer such unfavorable prospects for success, on account of exhaustion, local traumatism, and probable infection of the mother, and extremely reduced viability of the child.

The possibility of termination of labor by natural means is so unusual as to be worthy of no consideration in planning treatment, though it occurred in one of the cases to be here reported while preparations were being made for a version.

The case histories are as follows:

The first patient, para-vi, aged thirty-nine, had had three instrumental deliveries, and two spontaneous. The last child, born twenty months before, a spontaneous delivery, was lost during birth. The labor though not unduly long was characterized by very severe pain with marked overlapping, and resulted in death of the child.

She again consulted me in May, 1913, having felt life on the twelfth of the month. There was some question as to the date of the last menstrual period, it finally being decided that it had occurred about Dec. 17, 1912. She suffered much disability during gestation from edema or varices of the limbs and mild hydramnion. After passing by about ten days the calculated period of gestation, and with the head unengaged she finally consented to the induction of labor. This was attempted by the use of a large rectal bougie. Unfortunately, the membranes were punctured when the bougie had entered about 5 inches; and much liquor drained away. Labor pains of mild grade were initiated and the bougie removed in about

fifteen hours. The pain became severe about three hours later and I saw her after about one hour of severe pain. The child was transverse. Head left. Dorsum anterior. Elbow in vagina. I summoned assistance, prepared to do a version and gave one-fourth of a grain of morphia to control pain. Contractions became severe and force augmented by the abdominal muscles. On administration of the anesthetic it was found that during the interval a spontaneous correction had taken place. The hand appeared with the head. Delivery was accomplished absolutely unaided, and we felt that an unusually fortunate outcome had followed a nasty complication.

On seeing the patient seven hours later she had a temperature of 101, was complaining of great pain on the left side, and had just voided about $1\frac{1}{2}$ ounces of very bloody urine. I immediately catheterized and filled the bladder with boric and had the full quantity returned. In the morning, eight hours later, I found the temperature up, the abdomen tense and tender on the left side and in the left flank. But $1\frac{1}{2}$ ounces of urine were voided, and that deeply blood-stained. I could make out no free fluid in the peritoneal cavity. I filled the bladder, allowed the fluid to remain about three minutes and again regained practically all, and watched the vulva and saw none escape. I believed I had an internal rupture of the bladder. The patient was sent to the Presbyterian Hospital under Dr. Nicholson's care. It was there noted that the bed became saturated. Examination revealed a tear in the bladder admitting two fingers, situated on the left side at the vaginal angle.

Recovery was complete by the use of a permanent catheter alone.

The unusual features were a spontaneous correction of a shoulder; a large rent in the bladder, and prompt healing without any operative work.

The second patient, a primipara, aged thirty-one, seen in absence of engaged attendant. When first seen was in active labor with about six inches of the cord projecting from the vulva. The patient overwrought and hyperesthetic. Had been in labor for about eight hours. The cord prolapsed externally possibly half hour to hour. Uterine and abdominal action was vigorous. Examination showed shoulder presentation, elbow in vagina. Dorsum anterior. Head left. About $2\frac{1}{2}$ inches dilatation. Before sufficient anesthetization could be secured and the patient prepared, pulsation of the cord had ceased. Delivery by podalic version. Maternal convalescence uneventful.

The third patient, para-iii. First labor instrumental, second spontaneous; both vertex. Large fetus at term. Head over inlet, unfixed. Saw her in afternoon, and being at term, and having had second labor promptly started by castor-oil or quinine, advised their use. The head at this time over the inlet. Without onset of pain the membranes ruptured about 5 hours after the quinine and castor-oil. One hour later active labor began, and I saw the patient about one hour after this. Preparations for examination were leisurely made and then it was found that the shoulder was down—the hand at the outlet and contractions severe. The cervix would admit the

hand with but little additional dilatation. Anesthesia and version. Child weighed $10\frac{1}{2}$ pounds. Convalescence normal.

A brief analysis shows:

Mothers—

2 multipara—1 primipara—no mortality. Marked complication in one.

Infants—

One lost—prolapsed cord.

Causes of the shoulder position—

CASE I.—Possible deflection of head by the rectal tube. Have known vertex to be changed to shoulder by Pomeroy bag.

CASE II.—Moderate contraction—rupture membranes before engagement.

CASE III.—Rupture of membranes before engagement of large fetus with normal measurements and quantity liquor not unusual.

5211 GIRARD AVENUE.

THE TECHNIC OF APPLYING HEAT IN THE TREATMENT OF INOPERABLE UTERINE CARCINOMA.*

BY

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(With twelve illustrations.)

THE description in writing of the technic of the application of any surgical procedure of necessity must leave much to be desired in the way of completeness. The method that I shall outline depends for its effectiveness upon the fact that carcinoma is destroyed when the temperature in the mass is raised 113° F. (45° C.). On the other hand, normal tissue cells are not affected until the temperature rises from 132° F. to 140° F. (55° C. to 60° C.). I wish to emphasize this because many surgeons who are making use of the method still have the idea that it is necessary to produce a degree of heat sufficient to burn up the parts involved.

This defeats the purpose of the treatment which for its effectiveness depends upon the production of a low degree of *heat*, and not of fire. In other words, coagulation, and not carbonization, of the

* Read before the Section on Obstetrics and Gynecology, New York Academy of Medicine, April 15, 1915.

tissues involved is the effect desired. This is well shown by the record of some of my experimental work previously published.*

In my own clinic, I am in the habit of demonstrating the comparatively slight degree of temperature maintained in the electric treating iron by covering it with absorbent cotton. When the treatment is finished, the cotton is hot, but has not been altered in either color or texture. This merely indicates, I repeat, that a burning temperature is not used in the heating iron.

My experimental work has shown two important things: that this low degree of heat has an infinitely greater penetrating power, as far as distance is concerned, and that the high degrees of heat, producing a charcoal core, permit of only a surprisingly limited dissemination of heat. Paradoxical, then, as it may seem, especially when we forget physical laws, my "cold iron" has a greater capacity for killing cancer cells than has the cautery iron heated to a cherry red or even higher degrees of heat. Part of the explanation is that great heat immediately produces the carbon core just mentioned, while the low degree of heat does not. This "cold iron," then, not only permits greater penetration of heat in the cancerous mass; but, as can be readily appreciated, the rectum, bladder and ureters are in much less danger of being injured by a degree of heat sufficient only to make the pathological tissues thoroughly hot than by an amount which will immediately destroy them. A rather crude method—but a thoroughly practical one—of determining the amount of heat necessary to inhibit the further growth of a mass of cancer is to grasp the mass in the hand, encased in a median weight rubber glove. On an average, when the hand of the surgeon is encased in this weight of rubber glove, he can tolerate a temperature of 115 to 120° F. (46° C. to 49° C.). As will readily be appreciated, such a temperature will not cause a burn of the first degree. It is an interesting fact that the brown color of the rubber glove, which holds the malignant mass until thoroughly hot, is frequently transferred in part to the fingers of the surgeon, the fingers of the glove becoming appreciably lighter in color. The surgeon who attempts this work for the first time will be surprised at the slowness with which the heat penetrates the cancerous mass. A change of temperature is rarely appreciated, as a rule, until after the heating iron has been in the mass for from ten to twenty minutes, when the growth is small; and for a much longer time, when the tissues involved are even moderately

* Best Methods of Discouraging the Activity of Inoperable Cancer. A Study of Heat in Cancer. The Journal American Medical Association, May 23, 1914, vol. lxii, pp. 1631-1634.

extensive. When the cervical and vaginal involvement is pronounced, and has spread to the pelvis, fixing the uterus and parametrium, and probably involving the bladder and rectum, one rarely can get the tissues hot without a continuous application of the heating iron for at least from forty to sixty minutes. This slowness of penetration of heat, from what I have already been pleased to call my "cold iron," usually leads the inexperienced operator to turn on more heat. When this becomes sufficient in degree to burn the tissues, a carbon core is rapidly formed, as already detailed, and immediately the further dissemination of heat is inhibited.

This, again, is usually met by more heat which rapidly becomes dangerous to structures contiguous to, but outside of, the cancer area. When a charcoal core is found to have been formed in this way, it is necessary to remove it with the sharp curet. When this is done, turn down the current coming through the rheostat to a degree sufficient only to heat the tissues thoroughly enough to kill carcinoma cells, not cauterize them. When all the pelvic structures are fixed by the cancer involvement, the heat should be applied until everything is freely movable, as they are normally. This is an exceedingly important point.

The curet should never be used before the heating iron, even to get a portion of the implicated structures for diagnostic purposes. When the tissues are thoroughly permeated by the heat, the cells are fixed in such a way as to become immediately available for sectioning and staining without the further use of the usual hardening methods. At the same time the heat seals at once the lymphatics and blood-vessels, preventing the further dissemination of the cancer and mixed infection. In addition, the immediate nerve supply is cut off. This is the probable explanation of the freedom from shock and local pain which is the rule following this operation. It is no part of my technic to remove any of the pelvic structures, the seat of the carcinoma. The only exception to this statement is that I do remove both ovaries: first, to limit the blood supply; and second, to bring on the menopause where it has not yet occurred. If this is not done, a torturing form of menstruation may occur for a few periods from the cervical stenosis which occasionally follows the application of the heat.

The most distressing class of cases that one meets are those in which a recurrence of the malignancy follows a panhysterectomy. In these cases there is no exuberant mass to be used as one would kindling in order to develop heat. When recurrence develops after a total hysterectomy, it is usually of the infiltrating type (adeno-

carcinoma) and the invaded tissues left after the hysterectomy are not of sufficient thickness to permit of the development of a degree of heat necessary to kill the carcinoma cells. If a cauterizing temperature is used it cannot be regulated, and the result is a distressingly destructive effect which will probably destroy the most important part of the urethra, or make a hole in the bladder. This caution becomes additionally important if the recurrence is in any part of the pelvis, especially in either one or both of the broad ligaments. In other words, there is not enough mass in the recurrent pathology in which the heat can be disseminated, and the effect is at once that of the cautery which, I repeat, is always destructive in its effect. In order to overcome this lack of mass, I have tried filling the vagina full of a tightly bound beef mass in which, with an apple corer, I have made a hole for my heating iron. In this way I have succeeded very well in irradiating heat through the vaginal walls to the degree that experience and the laboratory have shown to be destructive to the cancer cell.

The most common seat of recurrence following a panhysterectomy is in the stumps of the broad ligaments and base of the bladder, and next, in the fascial walls of the pelvis. The most direct method of attacking and destroying these is through a vertical incision on the side of the vulva, outside of the lateral vaginal walls. I place a long, narrow, water-cooled speculum down to the malignant mass through this vertical incision and apply the heat until it has become too hot for the fingers which grasp the tissues from the pelvic side. The water-cooled speculum protects the vaginal and lateral walls of the incision, and when it is withdrawn, a few stitches with a cigarette drain at the bottom of the wound completes the treatment in this type of case. A word of caution is necessary in this otherwise simple procedure, viz., possible injury to some of the sacral nerves. A distressing form of foot drop on one side was a sequel in one of my cases.

It is utterly impossible to apply heat to the pelvic organs for the purpose of destroying cancer in the most effective way without opening the abdomen. With the abdomen open, the surgeon is at once made acquainted with the problem before him. More than this, he knows what degree of heat he is using, and more important than all else, he sees or feels just where he needs to apply it. Opening the abdomen in order to more effectively apply the heat and coagulation of the tissues involved in the malignant process—rather than carbonization—are two very important elements in the successful application of the technic here outlined. In order to do this

most effectively, three things are necessary and they are extremely important:

First, a low degree of heat.

Second, the heating iron must not be moved about; in other words, it must be retained in one position until that part of the malignant mass has been thoroughly heated for at least ten minutes, when it can be moved into a new location, and the process repeated.

Third, the heat must be applied until all the malignant, fixed pelvic structures are freely movable.

Technic.—The patient is prepared for a simultaneous or a combined abdominal and vaginal section.



FIG. 1.—Patient prepared for operation, showing abdomen.

The legs are elevated as for a perineal operation and the head of the table is lowered not only to empty the pelvis of intestines, as far as possible, but also to bring the vaginal field to a higher level. In this way the operator, applying the heat to the vaginal mass, can stand in a more comfortable position. It is important not only to have the buttocks project over the edge of the table, but also to be certain that they will remain there. In order to secure this, shoulder braces are necessary. Inside of these a well-padded sandbag of 6 or 8 inches diameter is an advantage; against this the shoulders will rest and also support the head. (See Fig. 1.)

It is important to shield the clean abdominal field from the septic vaginal discharges. This has been provided for in a most practical way by Miss Elfrieda Erlandson, chief surgical nurse of the Galesburg Hospital. This consists of the ordinary laparotomy sheet, folded three times transversely at the junction of the lower with the middle third of the sheet. This folded part extends between the knees of the patient and is fastened by tapes. The lower corners of the sheet are folded so as to form a hood over the feet, while the loose lower end of the middle part of the sheet is fastened by a band of adhesive plaster (2 inch), between the thighs across the upper part of the pubes. (See Fig. 2.)



FIG. 2.—Patient prepared for operation. Pelvic view.

The next step is the opening of the abdomen by a very free incision, and the examination of the entire abdominal cavity for evidences of metastases. I might say in passing, that in the larger proportion of cases (80 per cent.) no evidence of extension of the disease outside of the pelvis will be found. The abdomen is packed off from the pelvis by a single gauze pack 10 or 15 yards in length. The placing of this pack is done as far as possible without traumatism of the parietal or visceral peritoneum. When this unnecessary traumatism is avoided with the exclusion of the air from the abdomen due to the pack, both postoperative pain and adhesions, to say nothing of shock, are reduced to a minimum. The ovaries and tubes are now removed and both internal iliac arteries are tied. If this is

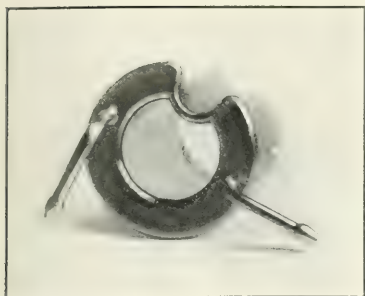


FIG. 4.

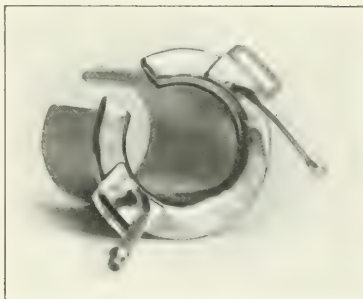


FIG. 5.

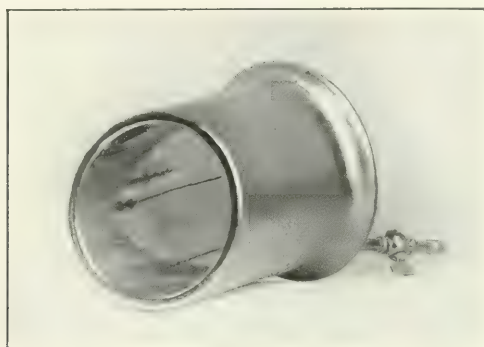


FIG. 6.

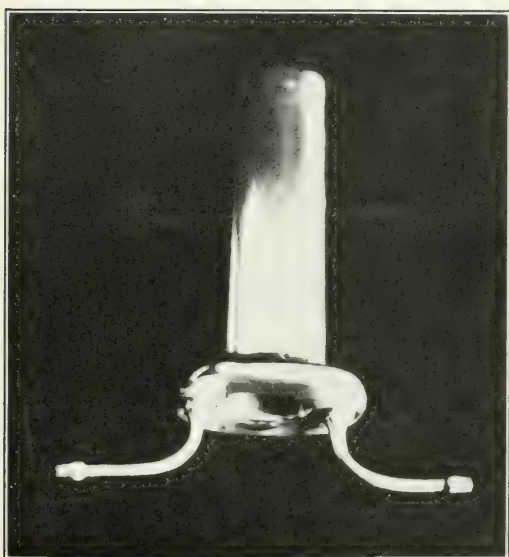


FIG. 7.

FIGS. 4, 5, 6, 7.—Water cooled specula.

(See Fig. 8.) It is usually necessary to maintain this instrument in place until the mucous membrane on the vulvar margin is ready to crack. In this way the vagina is made to fit the speculum rather than the speculum to fit the vagina. If the first stretching of the vagina with the dilator proves to be insufficient to permit the introduction of the desired size of the water-cooled speculum, removal for a few minutes and reintroduction of the dilator will allow of a much larger increase in the size of the vagina. Before introducing the water-cooled speculum (see Fig. 6) it is advisable to apply Tr. iodine, or Harrington's solution, to the entire vaginal surface. This is perhaps a protection should the vaginal or uterine walls be opened, during the treatment, into the pelvis. I say "perhaps," because in

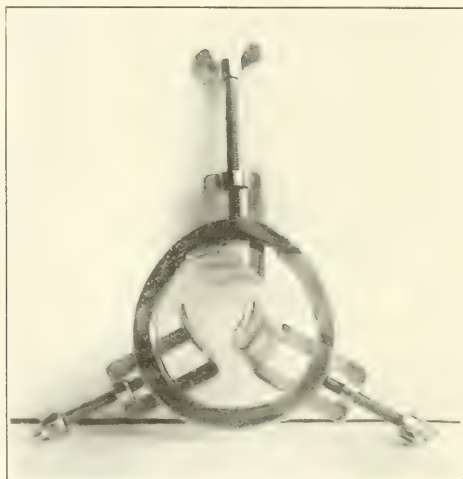


FIG. 8.—Retractor or dilator for vaginal walls.

former years, where this accident occurred, and no application of the iodine or other preparation made, no apparent harm was done. With the water-cooled speculum in place and retained there by an assistant or a trained nurse, the heating iron can be applied to the malignant mass. If the operator's hand in the pelvis finds no evidence of cancer except in the usual location, viz., the uterocervical junction, I still think it wise to pass the heating head to the fundus of the uterus. (See Fig. 3). In this way one is in the best position not to ignore a possible involvement of the body of the uterus. If the proximal end of the cervix has not been softened by the lesion, it will be found difficult to reach the fundus unless the cautery knife is employed. The best way of doing this is to use a cautery heat

sufficient to cut through the cervical canal laterally and vertically, thus, +. This will, of necessity, develop a carbon core, and before the cartridge-shaped heating head can be made to reach the fundus, a sharp curet for the removal of this core must be used. The operator's hand in the pelvis, grasping the uterus (Fig. 3), and the other tissues involved, can direct the assistant working from the vaginal side as to the degree of heat coming into the body and fundus of the uterus. More than this, he can guide the assistant, working from below, as to where he should direct the electric heating head. He can also aid the assistant, who may not be able to direct the heating iron into the involved masses, by pushing the malignancy down or onto the head of the heating iron.

A most important part of the technic should be emphasized again here. Do not remove the heating head from any of the involved structures when once placed, until the part is so hot that it cannot be held longer in the gloved hand. This applies not only to the gross mass in the cervix, uterus or pelvis, but also to the bladder and rectum when involved. To remove the heating head before the parts are thoroughly hot, simply defeats the fundamental idea of the technic which is, I repeat, a low degree of heat, continuously applied, until the carcinoma cells are killed. Where this technic fails of results, it will be found that too rapid application of the heat with the consequent failure to obtain penetration, will be the explanation. I might add, in passing, that this operation is not for the novice in surgery.

So far, I have described the technic for the average case of pelvic involvement. A word as to the best procedure in the event of the cervix and vaginal walls being extensively involved. The shank of the heating iron, when the cartridge-shaped head is in the body of the uterus, usually takes care of the exuberant overgrowth in and surrounding the cervix. The most difficult thing is to apply a destructive amount of heat to carcinoma cells that have already invaded the vaginal walls in the form of little pearl-like masses. I know of no more practical method than the use of the water-cooled speculum open at the top (see Fig. 5), and the angular thermometer (see Fig. 9), placed in the urethra. With this speculum and the thermometer, and the heating iron lying on the bottom of the speculum and raising the temperature in the urethra to 120° F. (49° C.), a degree of heat is obtained sufficient to kill carcinoma if maintained for ten minutes. This degree of temperature will not destroy the sphincters or injure the caliber of the urethra. When a degree of heat sufficient to kill carcinoma is assured, as shown by the ther-

mometer in the urethra, it can be removed and the speculum rotated slowly in the vagina until all the involved mucous membrane is treated by the heat. The degree of heat just referred to affects the surface of the mucous membrane, giving it a sickly yellow color which, when once recognized, also gives the operator a very practical

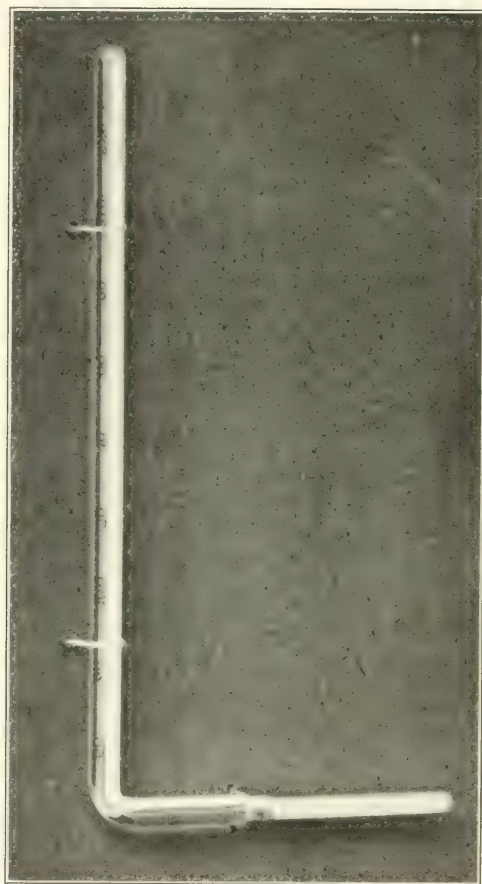


FIG. 9.—Thermometer.

method of deciding whether or not the tissues have been heated to a degree sufficient to kill carcinoma and not destroy the vaginal walls. Where the base of the bladder is involved, the angular thermometer or a straight one can be passed into the urethra and down on the floor of the bladder. This is made practicable by the use of the water-cooled speculum with a depressed groove. (See Fig. 4.) Here

again when the thermometer registers 120°F. (49°C.), a degree of heat coming into the bladder sufficient to destroy carcinoma is assured. Regulated in this way, a fistula is a rare sequel.

Where the carcinoma has fixed the rectal mucous membrane, two fingers of the rubber-gloved hand can be placed in the rectum and the heating head directed through the water-cooled speculum in the vagina, can be made to heat the involved tissues sufficiently and at the same time not injure the rectum. I have applied this treat-

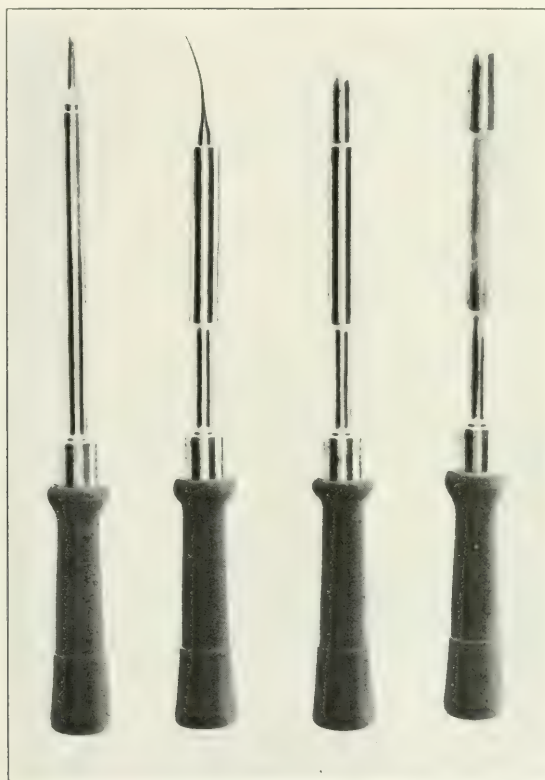


FIG. 10.—Electric heating irons.

ment in this way until all the fixed tissues palpable through the rectum were movable, and I have seen ulcers due to carcinoma in the rectum heal within a short time following the treatment.

Cold-water irrigation of the bladder and rectum through a double-current catheter can also be practised when applying the heat. In this way either of these organs can be made to serve the purposes of a water-cooled speculum and the treatment can be applied to the

involved parts just short of destroying the mucous membrane portion of the walls of either the bladder or rectum.

Every case of carcinoma of the uterus should have a preliminary cystoscopic examination of the bladder to determine the involvement that may or may not be present. A fistula into the bladder or rectum *through the uterus*, when produced by the treatment, usually heals spontaneously in six weeks. A fistula through the vaginal walls into either of these viscera is a more difficult proposition to deal with, mainly because of the scar tissue produced by the heat.

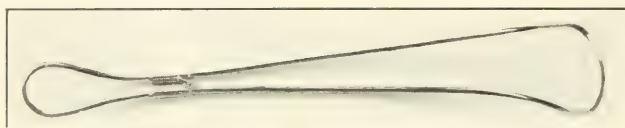


FIG. 11.

Attacking carcinoma of the pelvis from above through the abdominal water-cooled speculum (Fig. 7) must be left for another paper. I might say, in passing, that the problem in these extensive cases is one of drainage, *i.e.*, to get rid of the broken down cancer cells as quickly as possible, because of the danger to the patient from the absorption of an overwhelming dose of this product dangerous to life.

The volsellum forceps (see Fig. 12), and the wire retractors (see Fig. 11), are very useful instruments where the vaginal mass exceeds the diameter of the water-cooled speculum. The edge of the car-

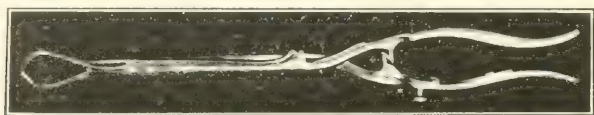


FIG. 12.

cinomatous cervix can be brought into contact with the heating iron by using these instruments through the water-cooled speculum to either lift or pull the mass within the reach of the heating head.

I have practically given up the use of the gas stove and the cartridge-shaped heating heads used with it. The reason is that the heat obtained in this way is intermittent and cannot be regulated with the supreme effectiveness that is absolutely true of the electric-heating irons shown in Fig. 10. In addition to this the continuous heat obtainable from the electric current not only shortens the time required for the treatment, but makes it much more accurate and effective.

The immediate after-treatment is usually that following a simple laparotomy. Toward the latter part of the first week a vaginal douche, usually 1-2000 formalin, is given every other day because of the offensive discharge. This discharge practically ceases at the end of two weeks. No local after-treatments are required because the water-cooled instruments perfectly protect the vagina and vulva. These instruments add immeasurably to the comfort of the convalescence because the application of the heat can be absolutely limited to the involved tissues. In this way also sloughing of the vaginal walls, with all the suffering that this entails, followed as it invariably is by cicatricial contraction, is absolutely avoided. This leaves the vagina in a practically normal condition and available for a repetition of the treatment should this prove to be necessary.

The final after-treatment of these patients should be that with the deep penetration method of the x-ray. I also have them report every six weeks for the first year. Again, before any treatment is undertaken, I insist that it may have to be reapplied for a number of times, and that the abdomen is to be opened each time. This preliminary understanding, which almost amounts to an agreement, serves to minimize the wear and tear to the nervous system of both patient and surgeon, in the way of explanations, after each notification that another treatment is necessary. About 50 per cent. of my cases require a reapplication of the heat. In two cases it has been repeated five times. Unfortunately, practically all of my cases so far have been of the utterly hopeless type, as far as any other treatment is concerned. At this stage of the development of my technic, I have no right to talk of results. But I am convinced that a surprisingly large percentage of these cases can be transferred from the hopeless to the hopeful class by a technic which is not as formidable as a well-executed Wertheim, and the immediate, and in many cases the remote, effects of which are truly benevolent.

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INVERSION OF THE UTERUS WITH REPORT OF A CASE OF COMPLETE INVERSION WITH PROLAPSE.*

BY

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(With three illustrations.)

COMPLETE inversion of the uterus has been said to be the rarest of all the complications of labor. For this reason I feel some hesitancy in presenting this subject and case to you, for it is my opinion that at gatherings such as this we are often too liberally supplied with the unusual and extraordinary cases and not enough with the everyday facts of medicine and surgery.

The shortest definition of inversion is that the uterus is upside down and inside out.

Many theories as to its etiology have been advanced, and for the sake of convenience they have all been classified under two heads, namely: (1) Spontaneous, (2) Violent Causes.

* Read before the South Texas District Medical Society, April, 1915.

Taking the spontaneous causes, with the exception I believe of Rokitansky, Duncan and a few others, the majority of authorities notably Shauta, teach that in order for a uterus to become inverted it must be relaxed or atonic at least in certain portions; and the most generally accepted theory is that there is a paralysis of the uterus at the placental site, and the weight of the placenta causes a sinking of the uterus at this point. Then the portion thus inverted is supposedly driven farther down by the peristaltic action of the remainder of the uterus which is active. It is said that this form of inversion is most apt to occur where the placental attachment is at the fundus.

A review of the muscular arrangement of the uterus and its action will, I think, tend to show that while we might have a partial inversion from paralysis of the placental site, it is not probable that we

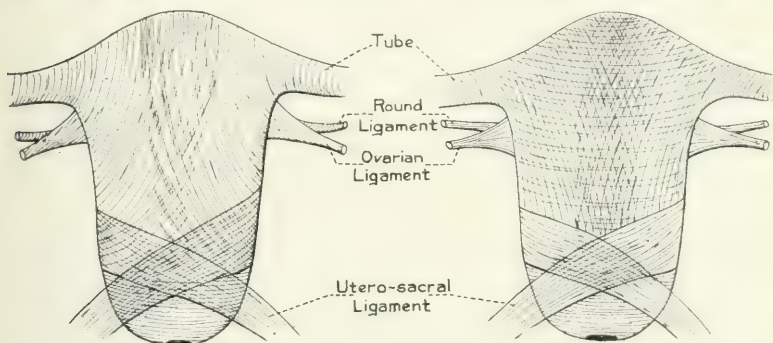


FIG. 1.

have a complete inversion from the spontaneous action of the uterus itself.

The musculature of the uterus can for all practical purposes be said to be arranged in three layers: (1) An inner, thin, longitudinal layer, which is probably nothing more than a hypertrophied muscularis mucosæ; (2) a middle circular layer which forms the greater part of the muscular coat and which is by far the most powerful layer; (3) an outer coat of longitudinal fibers which decussate and give the appearance of a longitudinal and a circular layer with the longitudinal fibers predominating. This is also a weak layer which lies in close relation with the superimposed serous covering (Fig. 1).

Why does an organ with such muscular arrangements expel a foreign body or fetus instead of contracting down on it by its strongest circular layer? The answer depends on three factors: (1) The musculature of the fundus is more powerful than the musculature of

the lower uterine segment, hence the expanding centrifugal force will be greater at the lower uterine segment than the contracting centripetal force of the contracting muscles, and the os dilates. (2) The intraabdominal pressure and force of tonicity of the abdominal muscles is exerted more at the fundus than at the circular portion opposite the lumen of the vagina. (3) The contraction of the uterus, like all other hollow organs, is peristaltic, beginning at the fundus and gradually passing to the cervix, said to be brought about by the fact that the longitudinal fibers are contracted in expelling a foreign body or during labor, almost constantly, while the action of the circular fibers is more or less intermittent.

Now to come back to spontaneous inversion, as stated above, most authorities agree that there is a paralysis of the placental site or inertia of the fundus, at which point we most frequently find the placental attachment in these cases. If this is true we have a paralysis of the most powerful part of the uterus as regards muscular contractions, and a greater interference with the contraction force of the longitudinal layers, whose contraction force is broken; but the contraction force of the circular fibers is not interfered with except in the paralyzed area. Thus the central portion of the uterus becomes more active and powerful than the fundus and the peristaltic action of the uterus is interfered with. (Fig. 2).

We have therefore the same condition of affairs regarding the fundus that we normally have regarding the lower uterine segment; and when this strong circular layer, now strongest in the central portion of the uterus, contracts, the action on the paralyzed or inert fundus would be an increase of the expanding centrifugal force at this point which would have a tendency to reinvert the inverted area; or by an equal counteracting intraabdominal pressure it would remain stationary. But if we had an increase of intraabdominal pressure enough to overcome this contracting force it might further indent the uterus, and thus the intraabdominal pressure would cause this apparent spontaneous inversion and not the action of the uterus, as held by many. Again, Dr. Geo. H. Noble of Atlanta, Ga., has shown by an interesting series of experiments in intraabdominal dynamics, that the intraabdominal pressure in a normal subject lying on the back is *nil*, but in assuming the standing or sitting position it increases to 18 mm., the squatting position 20 mm., and coughing or straining shows 30-40 mm. of mercury. Also in the same article he shows that the amount of intraabdominal pressure exerted in any direction is in proportion to the peritoneal covering exposed to that force. Considering the above facts one can see that there must be some

external force, as by coughing or straining, to make the intraabdominal pressure great enough to overcome the uterine contractions. Again, given a partial inversion from depression of a relaxed fundus, we have a greater area of peritoneum at that point exposed to the downward intraabdominal pressure, which would favor inversion of this pressure were in any way increased.

If the above is true I think it would be better to classify all complete inversions following labor as due to violence.

The definition of spontaneous is given as "occurrence without external influence" and hence this all tends to show that all complete inversions following labor are due to violence of some kind or bad obstetrics or both, and that there is no such thing as spontaneous complete inversion. Edgar says "In very rare instances it may occur without reproach to the physician, for an incomplete inversion could occur from weight of the placenta, increased by blood accumulating behind it, pulling on a relaxed fundus."

As to inversion by other forms of violence, to which the vast majority are due, may be mentioned: traction on the cord or unseparated adherent placenta especially with a relaxed uterus; short umbilical cord or relatively short cord from coiling round the child; too forcible expression of the placenta by Credé's method, etc. King says: "A relaxed womb may be inverted either by pressure from above (Credé expression or intraabdominal pressure) or by traction from below. Inversion of a well-contracted uterus is well nigh impossible."

A record of the number of cases of inversion could not be found and the statistics show a tremendous difference in the various figures. These vary from the report of the Rotunda Hospital, Dublin, covering 123 years where there were 190,883 deliveries and only one case of acute inversion, and the St. Petersburg, or should I say Petrograd, Lying-In Institute where in fifty-four years there were 200,000 births without a case of inversion. In contradistinction to this Rehrer estimates that it occurs once in 2000 deliveries. Taking an average of statistics of ten different men it shows one case in 128,876 labors. Complete inversion is probably more common in the practice of midwives and physicians who do not report cases, the reasons for this opinion according to B. B. Browne are that (1) ancient authors give such accurate descriptions of the condition and (2) because in very early times women were delivered in the standing or kneeling posture or sitting upon a hollow stool. (This again favoring the theory of increased intraabdominal pressure as a cause.)

A word here as a plea for the more rigid enforcement of the laws

regarding the practice of midwifery in this State might not be inappropriate. The doctors are in large measure responsible for the laxity of this law and it should be the united effort of physicians to stop a great deal of this meddlesome, ignorant midwifery.

The most marked symptoms of inversion are those of shock, with cold, clammy skin and rapid, thready pulse, which shock, being out of all proportion to the amount of hemorrhage, is said to be due to the decreased intraabdominal pressure and stretching of the peritoneum and nerves of the broad ligament. Hemorrhage is the next most important symptom, and this may be profuse or slight. In the case seen personally the hemorrhage was very slight. Usually there is acute pain at the time of the accident. There may be convulsions, reflex cardiac paralysis, and anemia. The cervix may constrict the inverted uterus and cause sloughing or gangrene. During inversion it is common for intestines to become lodged in the inverted sac, which if not reinverted may incarcerate these organs and cause ileus or sloughing. More commonly the uterus becomes infected causing a septicemia. In very rare cases the uterus has been said to reinvert itself spontaneously.

The physical signs are: (1) The presence in the vagina or protruding from the vulva of a rounded tumor mass, which bleeds on handling, and is sometimes felt to contract in the hand (not mentioned in text-books), (2) the absence of the fundus in its proper position within the abdomen.

The diagnosis is usually easy and apparent, and should give no trouble if the possibility of this accident occurring is borne in mind, together with the symptoms and physical signs.

The prognosis is usually bad and should be guarded. The figures are given as 50 per cent. mortality from shock and hemorrhage. In 1843 it was found that 80 out of 109 cases died, and Vogel in 1900 reports a mortality of 22 per cent. Early reinversion improves the outlook.

As regards treatment prophylaxis is of paramount importance.

Aside from the usual modes of prophylaxis, namely, not pulling on the cord, especially between pains or with a relaxed uterus, etc., much could be done, as before stated, by more stringent enforcement of the laws regarding the practice of midwives.

However, when the accident has occurred the uterus should be replaced at the earliest possible moment, in spite of the fact that some of the latest text-books advise waiting for the shock to subside before exposing the patient to the added shock of replacement. But as long as the uterus remains inverted the causative

factors of the shock are still present; while in time these will adjust themselves and the shock subside, it would consume valuable time in which the cervix could contract, and thus make reposition far more difficult or impossible; again there is very little added shock in the replacement if done at once while the cervix is open and relaxed, for under these conditions replacement should not be difficult. One should remember in replacing such a uterus to use what force is necessary in the axis of the superior strait and many failures may

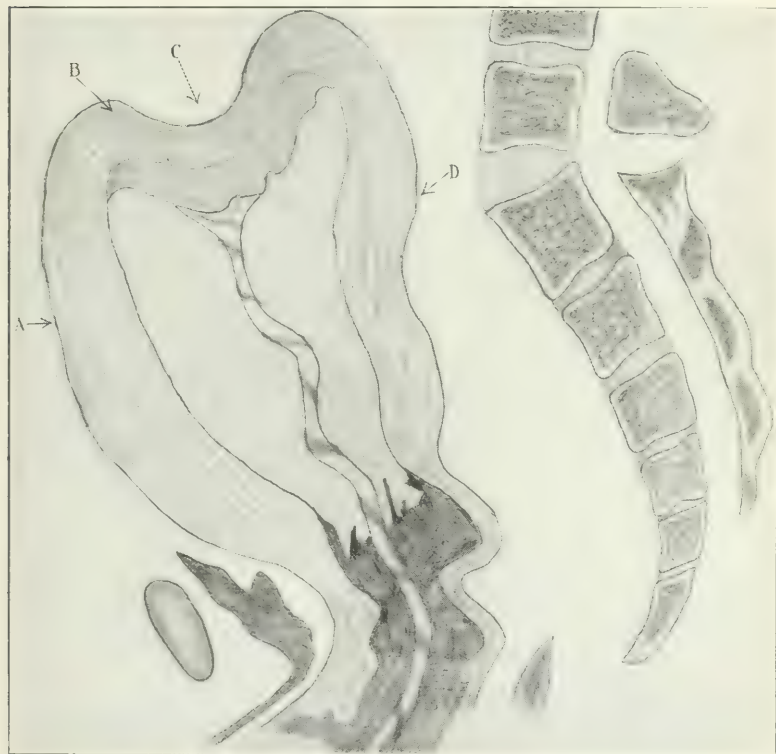


FIG. 2.

have been due to a lack of this precaution. After reduction it is well to give a dose of ergot hypodermatically and continue bimanual compression of the uterus until it is felt to be well contracted. In the article by Dr. Noble, previously referred to, he showed that if the abdomen were firmly bandaged, and perineal counterpressure applied, the vaginal and intraabdominal pressure were equal. Hence in the after-treatment of these cases it might be well to apply an abdominal binder with counteracting perineal pressure to guard

against a recurrence of the accident. If reposition is impossible without too prolonged or violent manipulations it is wiser to wait until the puerperal period is passed and resort to one of the many operations given in works on gynecology.

In replacing an inverted uterus, however, asepsis, gentleness,

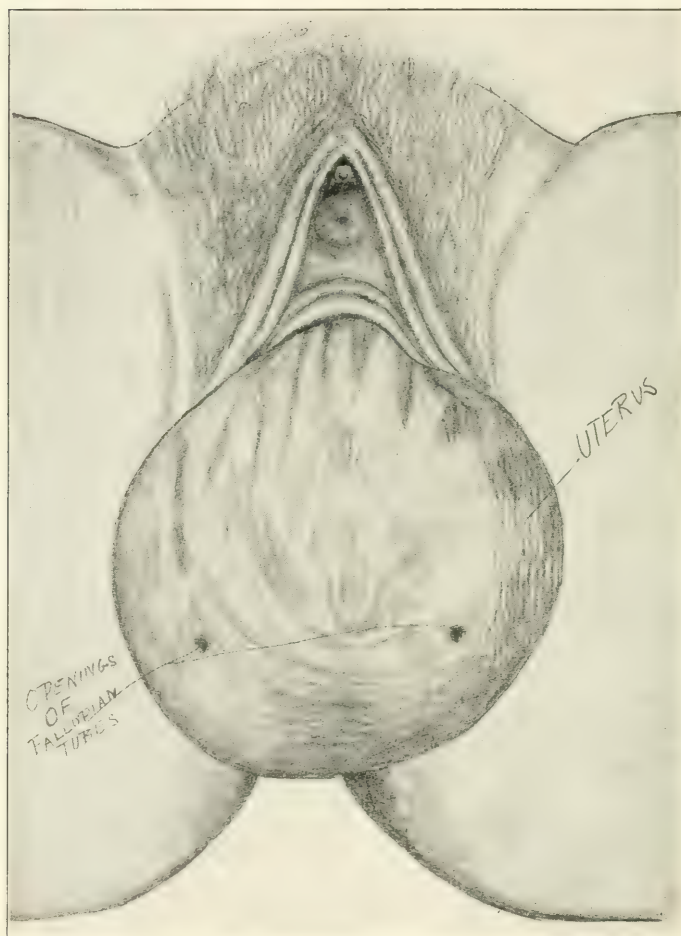


FIG. 3.

patience, and pressure in the axis of the superior strait should be our watchwords, and while a synonym for inversion is anastrophe another might well be catastrophe.

CASE.—Mrs. S., seen Feb. 24, 1913, Mexican; primipara. Family and personal history negative. First menstruated at thirteen, last

menstruation May 10, 1912. First seen twenty minutes after delivery in the squatting position by midwife who had made traction on the cord. Patient greatly shocked. The physical signs are best shown in the accompanying diagram, Fig. 3. Replacement was easy and patient made uninterrupted recovery. The same patient was delivered again and without complications July, 1914.

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727 KRESS BUILDING.

X-RAY DIAGNOSIS OF PREGNANCY.

BY

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(With one illustration.)

It is only recently that x-ray findings in pregnancy have shown anything except indistinct shadows, without detail, giving no idea of the position of the fetus. The technic as carried out at the Kings County Hospital has proven to be of much value, both as to diagnosis of position and practically in proving the existence of a suspected multiple pregnancy.

O'Donnell of Chicago, reported in the *American Medical Association Journal* of March 16, 1912, a case referred to him by Dr. J. B. Murphy for x-ray diagnosis with a history of existing pregnancy with severe pain at the left costal margin where a resistant mass could be mapped out. The radiograph (slightly retouched)—mark

this, showed a breech presentation with the right arm straight, no perceptible articulation at the right elbow and no clear-cut one at the left elbow. The findings were proven after delivery.

McLean and Hickey of Detroit, Mich., have proven the existence of a pregnancy in a very stout woman by the x-ray.

J. B. DeLee in a discussion of the subject states:

"The x-ray has proved useless in the diagnosis of the size and shape of the female pelvis with a view to determining the possibility of mechanical difficulties during labor. One can recognize gross deformities, distortions and narrowing of the outlet. One can determine the location of the larger portion of the pelvic lumen.



FIG. 1.—X-ray picture of twin pregnancy.

In fat women or in the differential diagnosis between pregnancy and fibroid tumor, the x-ray is helpful. In illegitimate pregnancy, where examination is refused or cannot be suggested, the x-ray could be used. Extrauterine pregnancy cannot be diagnosed as such. Lithopedion and calcified fibroid are difficult to differentiate. Twins should be easily discoverable after the sixth month. One might recognize hydrocephalous, anencephalous and double monsters. You might determine whether the child is well formed before Cæsarean section. Owing to the varying regularity of the process of ossification in different bones during gestation, the intrauterine age of a premature fetus cannot be told. Injuries to the fetus are easily determined, such as fractures of the extremities and skull."

Many of these suggestions of De Lee have never been seen by the x-ray in the pictures which the author has had taken, perhaps because he has not had the particular cases in which they were discoverable, but, from his study of the radiograph, he would not think it possible to determine the many findings DeLee has suggested in his discussion.

The author's case, of which he presents the radiograph, was taken near term. The case was reported at a meeting of the Brooklyn Gynecological Society. The plates were not retouched. We only suspected the existence of a twin pregnancy owing to a lack of positive findings. A reference to the picture shows the required positive evidence.

375 GRAND AVENUE.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Stated Meeting, March 9, 1915.

The President, DR. JOSEPH BRETTAUER, in the Chair.

DR. E. W. PINKHAM presented

A CASE OF VISCEROPTOSIS WITH RESULT OF OPERATION.

Miss A. E., aged twenty-nine, was admitted to Woman's Hospital Dec. 13, 1911, with the following history. Family history, negative. Habits good. No previous illness except "stomach trouble" which she had had for a number of years. Sometimes it was so distressing that the family physician washed out her stomach daily for weeks at a time. Menstruation always regular, two or three days. No pain except last month, Nov. 15, when she had some pain in left side.

One week ago, patient was taken with a severe dull pain in lower left abdominal quadrant. This was accompanied by chills, fever, nausea and dizziness. There was some tenderness to touch in left iliac region. On examination, no distinct lesion could be made out. The fever subsided after rest in bed for a few days, but the pain continued.

On Dec. 21, an exploratory laparotomy was advised. On opening the abdomen all the abdominal viscera were found ptosed, but no sign of an acute process was visible. A double nephrorrhaphy by Bissell's method was performed. Patient was discharged on Jan. 20, 1912, with some relief. A carefully fitted abdominal supporter was furnished her and she was told to report every month for

observation. For a while she had more or less relief and disappeared from the clinic.

On Jan. 1, 1915, she appeared at the writer's office, complaining that the left-sided pain was much worse and was situated now in the upper left quadrant. There was some nausea, occasional vomiting and a dragging sensation in the left hypochondrium. For the past six months she had been unable to retain an ordinary meal although small amounts of liquid were retained. Two months ago she had a



FIG. 1.—Position of stomach before operation.

sharp pain in the epigastrium, which has persisted. She had lost 10 pounds, was very nervous and could not sleep. Patient admitted to Woman's Hospital. X-ray picture showed extreme degree of ptosis of stomach, no sign of ulcer.

On Jan. 23, 1915, Rovsing's operation for gastric colptosis was performed by sewing the superior third of the anterior wall of the stomach from the cardia to the pylorus to the abdominal wall with three No. 4 twisted silk sutures tied outside the cavity. The mesen-

teric attachment of transverse colon was sewed to the greater curvature of the stomach.

Patient made a good recovery and to date, Feb. 23, is entirely free from symptoms. The accompanying x-ray picture shows the position before and after the operation. Of course, the permanency of the cure can only be ascertained by time.

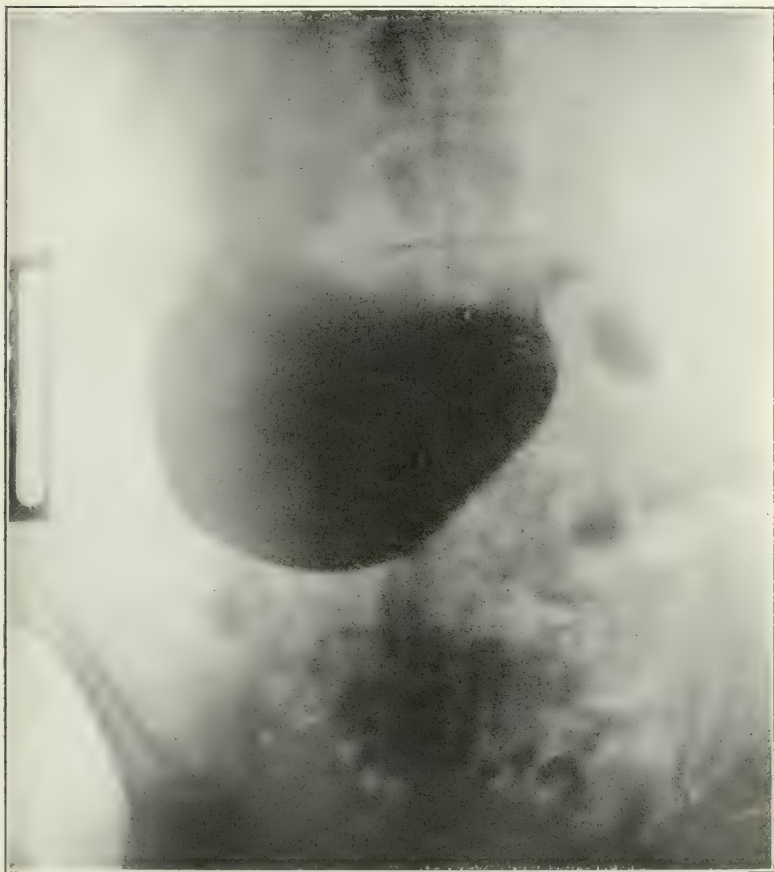


FIG. 2.—Position of stomach after operation.

Picture No. 3, shows the position of both kidneys after the Bissell's operation. No picture was taken before this operation.

The paper of the evening was read by DR. E. W. PINKHAM, entitled

PELVIC VARICOCELE.*

* For original article see page 244.

DISCUSSION.

DR. H. C. COE, in opening the discussion, said: "It is interesting to me to see how history repeats itself. When I saw the subject of this paper it occurred to me that I had written on the same one several years ago, but I did not realize how long it was until I looked it up and found it was twenty-five years. It was in reply to a paper by the late Dr. A. P. Dudley on the same subject read before the Alumni

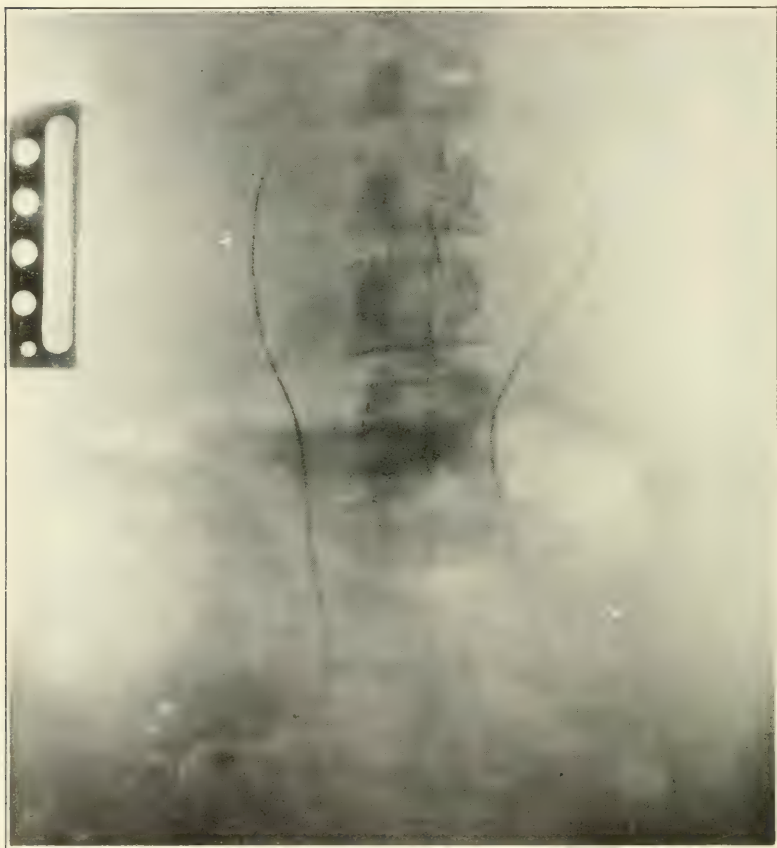


FIG. 3.

Association of the Woman's Hospital. He took the stand that this condition was analogous to that in the male and I remember that one of the points he made was that it was associated with cirrhotic ovary and he laid stress on the fact that the pain was in the lumbar region, especially on the left side. I took exception in the first place to comparing the condition with that in the male, as they are not analogous, and in the second place to the fact that the varicocele

which he described was not confined to the pampiniform plexus, but involved all the veins of the broad ligament, so he made a practice of ligating all the veins of the broad ligament from the base upward. He claimed that the diagnosis could be made easily, and by examining the patients he noted the fact that they were relieved by resting on their backs and had pain on taking the erect position. He claimed that he was able to feel distinctly the enlarged veins. I think that view is still held by many. Of the cases which he presented three of the patients had passed the menopause and the ovaries were removed, as well as ligation and division of the affected veins.

"I was interested in the subject but took the ground that it was extremely difficult to distinguish between chronic congestion and permanent dilatation of the veins with thickening of the walls, which is the condition in true varicocele in the male, and also that the pain which was described was quite likely to be due to other conditions. Hypertrophy of the ovaries would be the natural result rather than atrophy. I do not think that it is any easier to discover the cause of obscure pelvic pain now than it was twenty-five years ago. I must confess that although I have tried to make a diagnosis of varicocele before opening the abdomen, I cannot say that I have ever seen a case in which I have been successful. It has been my practice to double ligate and excise the veins where they are markedly enlarged though I have usually found accompanying disease of the ovary. Such a condition is found not only as a result of displacement of the uterus, but also as the result of constant congestion of the pelvis from prolonged sexual irritation, repeated pregnancies, subinvolution, and other conditions which prevent the venous outflow.

"The paper is a most suggestive one and I think that when we have more precise anatomical knowledge, we shall have more exact clinical experience."

DR. E. B. CRAGIN, in discussion, said: "I would like to ask a question, to draw out the experience of the men here, in regard to the frequency of emboli following operations for fibroids with these very marked varicosities in the broad ligaments. We have all met with these conditions frequently, especially in large fibromyomata, and I think we have all feared that emboli would follow operation in such cases, yet it is my experience that the cases which have been followed by emboli have usually not been those that have had large varices."

"I would like to know if that has been the common experience."

DR. H. C. COE.—"It has been mine, Mr. President."

DR. RALPH WALDO, in discussion, said: "It seems to me that the etiology of it is rather obscure. I do not question the effect of the muscles on the venous circulation, but these vessels become varicose after they have left the uterus in the broad ligaments. Now, it's the obstruction to the venous return some distance from the uterus, very likely due in certain instances to pressure of tumors, constipations, malpositions, etc., but it seems to me that Dr. Pinkham has struck another keynote that is very important and that

is irritation, the result of lacerations or some other condition in the uterus, which causes a congestion of the entire pelvis, that results in dilatation of these blood-vessels.

"The doctor has spoken of a very important and interesting clinical fact and that is the raised arterial tension as being associated with a varicose condition of the veins about the uterus. It seems to me that would be due perhaps not so much by the raised arterial tension as to the disease which produced it. If you take a patient with a lot of varicose conditions in the extremities and different portions of the body, you are very apt to find a diseased condition of the blood-vessels that will result in a decided increase in the arterial tension, and I believe the arterial tension is the result rather than the cause of this varicose condition."

DR. R. T. FRANK, in discussion, said: "I want to look at this thing from a purely practical viewpoint. Apparently, this operation must always be done as an exploratory operation because, as Dr. Pinkham says and Dr. Coe bears out, it is practically impossible to diagnose the presence of pelvic varicocele except by exclusion. The operation, therefore, is performed for consistent pain in one or both iliac regions and possibly, I should judge, for concomitant symptoms due to constipation, etc. Now, under those circumstances, unless there are really some gross lesions requiring operation, I personally would hesitate very much about going ahead because, although an exploratory laparotomy, after all, is usually a safe procedure, a laparotomy ought not to be lightly undertaken.

"There is one other point that has occurred to me and that is the possibility of double ligation or excision producing relief not through the ligation of the vessels, but by the fact that the nerves are resected in continuity or excised as was advised, I think, by Harris, of Chicago."

DR. J. N. WEST, in discussion, said: "I have from time to time seen some discussion of this subject of varicose veins in the pelvis and of the pampiniform plexus and have never taken it very seriously because I thought that it was a condition that would be difficult to diagnose and that it was not a condition which in itself was very serious and that a laparotomy itself is a serious matter. In laparotomy, of course, the mortality rate may be very low, but if we had a friend starting on a journey and there was one chance in a hundred, or one chance in two hundred, that he would never return, we might bid him farewell with a good deal of feeling; so we have a mortality rate in abdominal section. For that reason I have not taken these discussions very seriously, considering the lesion to be nothing more than dilated blood-vessels; but Dr. Pinkham, I think, has put this in a very clear way to-night and in a very conservative way. He especially lays weight on the importance of pain of long duration and discomfort of long duration, which is really a serious matter to the patient and, therefore, one that would make it justifiable to take some risk to relieve the patient if it is possible to do it. Then his bearing out his theories by reported cases that remained relieved for months afterward,

is, to me, altogether a convincing thing, and I believe there is a field for operation for this lesion. We know that in a good many of these cases of obscure pain where we cannot possibly make a diagnosis beforehand, we occasionally find something that is very definite when we get inside; so I think that every point in his paper is well justified by his experience. However, I think we should be very careful that we do not resort to operation unless the symptoms are as he suggested, because we do have evanescent pains, pains that come and go as the result of purely physiological functions. We all know that we may have small cysts of the ovaries that may cause severe pain for a time and then it may disappear, and other pains arising from purely physiological conditions.

"In regard to Dr. Cragin's question about thrombosis of the veins in operations upon fibroid tumors: I have never had a case of thrombosis following operation for fibroid, but I have had four cases of sudden death from thrombosis following other operations, chiefly in operations in which there were more or less inflammatory conditions—one an appendicitis, one in a case of pyosalpinx; one in a case of operation for retroversion, in which adhesions were broken up to the broad ligaments and tubes; and the fourth was also a case of pyosalpinx."

DR. JOSEPH BRETTAUER, in discussion, said: "I would like to endorse to Dr. Cragin's remarks in connection with this subject. Most of the cases of fibroids where we find highly developed varicose veins usually are accompanied by a distinct edema in the broad ligament, sometimes surprisingly so, and very very rarely does the patient complain of any pain. Therefore, I am not so sure that the varicosity in the pelvic veins is the actual cause of the symptoms complained of.

"They are uniparous women and sometimes old maids, and if you take the history into consideration very carefully, you find always abnormalities in the sexual sphere, and I should certainly be tempted to consider that a very important factor in the etiology."

DR. E. W. PINKHAM, in closing the discussion, said: "As far as Dr. Coe's remarks are concerned, I, of course, agree with him in general, but, knowing some of his previous writings, I have to disagree with him in regard to cystic ovaries producing pain. These cysts of the ovary may become distended by blood and thereby produce pain, which is relieved by a little judicious treatment. It isn't the continuous dragging pain which varies in intensity, sometimes sharp and shooting and sometimes dull. That is the reason why I did not mention Dr. Coe in this paper.

"I looked up the subject of fibroids in preparing this paper because in these fibroid cases we see so many large veins. It seems to me, however, as Dr. Brettauer says, that those veins are really physiologically enlarged. These enlarged veins are generally on both sides and all around. Very few of these cases have pain.

"As regards thrombosis: it is a very interesting subject. I remember looking it up some years ago in some of our own cases and

found that the only cases in which thrombosis occurred, were those cases of fibrosis uteri in women pretty well along in years.

"Dr. Studdiford remarked that the uterine propulsive force, or rather the propulsive force of the uterine musculature, was an important cause. That is, of course, very true, but if it were entirely true and the usual cause, we would have more general varicosities, I think.

"The point brought out relative to blood pressure is very interesting to me and I am going to take that up in regard to dilated veins.

"Dr. Frank's remarks as to the cutting of the nerves relieving the pain may be true, but, it seems to me, that the pain is produced by pressure on the nerve ending, by overdilatation of the vessel walls. I remember one case in particular very distinctly, where the veins were as large as the little finger and they were only in the pampiniform plexus, and in that case there were no other lesions at all and the pain was definitely in that locality and nowhere else. Double ligation relieved it. It is a good question, whether it is the cutting of the nerves that relieves the patient, but this patient was relieved, and I think, by double cutting of the veins.

"As far as diagnosis is concerned: it is hard and is mostly made by elimination, and, as Dr. West has said, one never wants to operate for suspected varicocele of the pampiniform plexus unless the suffering has been in existence for a long time and unrelieved by any form of judicious treatment, and then only to relieve the patient and keep her from going into a highly neurasthenic condition.

"I saw a case last Wednesday in which I made a diagnosis of varicosity of the left pampiniform plexus by bimanual examination, by a feeling of fullness, by squeezing it out and, after the pressure eased, a return to the first fullness. On opening the abdomen, very large veins were seen in that left pampiniform plexus and there only.

"What Dr. Brettauer said in regard to the condition of these patients as being purely nervous in many cases, I agree with, of course, but most of these cases have pain and my experience has been, that where pain is persistent and in the same place and at all times and continuous, whether she is nervous or not, I think that we are only justified in relieving her in any way that we can, even though we do think she is only neurasthenic."

Stated Meeting, April 13, 1915.

The President, DR. JOSEPH BRETTAUER, in the Chair.

DR. L. G. BALDWIN presented a

REPORT OF OVARIAN TUMOR, THE SIZE OF A FETAL HEAD, COMPOSED
OF THYROID TISSUE.

Mrs. S., aged thirty-eight, married three and one-half years. Instrumental miscarriage of twins at six months' gestation two years ago. Pregnancy interrupted on account of abdominal tumor.

She consulted me in May, 1914, stating that she had been ill for ten years with cramps and bearing-down pains in lower abdomen for that length of time. The pain was nearly constant and was similar to that she experienced when menstruating.

She felt a lump in her left side at this time.

Menses began at fourteen years of age with cramps for one day until after miscarriage. No pain of any account since. The flow is for two days and scant in amount.

Except for a fall down the Elevated R. R. stairs ten years ago her history was negative. There was no special loss of flesh and she was well except for extreme nervousness.

The diagnosis before operation was subperitoneal fibroma. A myomectomy was planned.

At the operation the growth was found to involve the left ovary. It was adherent throughout except for a small area on the superior aspect. The dissection was difficult but there was little bleeding. The growth had the appearance of malignancy. It weighed 3½ pounds.

The right ovary was normal and was not removed. The microscope showed the entire growth to be adenomatous thyroid tissue with hyperplasia. There was no ovarian tissue found.

The patient has continued in good health.

It is now eleven months since the operation.

DR. R. T. FRANK, in opening the discussion, said: "I have had the opportunity of observing two cases of this nature, one a case of my own and the other a case of Dr. Samuel M. Brickner's, which I have been watching now for a year and a half. The first was a perfectly simple case without any adhesions, the type of tissue being that of a simple colloid goiter. The second case, which was the one of Dr. Brickner's, was also free of adhesions and had the appearance of a malignant thyroid tumor, so that the pathologist who examined the case was naturally in considerable doubt whether to call it malignant or not malignant. The context so far has shown that this tumor is apparently nonmalignant, although it has the hallmarks of a tumor which in the thyroid would surely speak for malignancy.

"Of the cases reported in the literature I do not recall any, really, that was completely adherent like the one reported by Dr. Baldwin, and I wonder whether the adhesions were not secondary to some torsion of the pedicle or something of that kind.

"It is a great pity that when interesting tumors are reported here, that this society is without the proper means of showing lantern slides or else showing them under the microscope and, therefore, we are not in a position to properly discuss these tumors. In the case of doubtful tumors, for instance, we have to take simply the diagnosis that is given and I want to take this opportunity of stating the fact that it would be of great aid if we could really diagnose these tumors for ourselves by either seeing them under the microscope or on the screen."

DR. L. G. BALDWIN, in closing the discussion, said: "In answer

to Dr. Frank's question I wish to state that there was no torsion of the pedicle, which was rather a broad one, and the adhesions were of an inflammatory nature, as I imagine we get in many of these ovarian growths."

DR. S. WIENER read a paper on

A STUDY OF THE COMPLICATIONS OF OVARIAN TUMORS.*

DR. L. W. STRONG, in opening the discussion said: "The most interesting thing that occurred to me from a pathological standpoint was the clear bearing it has on the fact that carcinoma is not a fixed and definite entity, but there are transitions between carcinoma and other forms of growth, as the papillomata and adenomata. This is also seen in many tumors of the breast. That is rather at variance with many of the older ideas about the formation of carcinoma, which were that it was not by any form of degeneration, to use the word that the reader of the paper employed, whereby he, no doubt, means the simplification of the cells; that is, anaplasia of the cells, the reversion to the simple embryonic type. That seems to be the method of formation certainly in this class of tumors. The older view held that a tumor does not grow by transformation of the cells of the part, but that it always arises exclusively from its own cells and that there is no change at the edges of the growth from the fixed cells of the part into tumor cells. These tumors seem to favor the appositional idea in the fact that there are transformations in the line of anaplasia.

"In regard to the sarcomatous changes: one has to be very careful in making a diagnosis of sarcoma in many of these ovarian tumors, because there is no definite criterion for the establishment of a sarcoma, while there are many changes that occur in the stroma cells in the way of simplification of cells which are not even clinically malignant, although they give every ocular evidence which we are accustomed to regard as that of sarcoma."

DR. H. N. VINEBERG, in discussion, said: "It is pretty hard for Dr. Wiener to answer the last question because he is not responsible for the operations. He is simply giving a resumé of the records of the hospital. So far as our service is concerned—so far as my own operations are concerned, the patient is not admitted to the hospital unless there are symptoms, and if a woman presents herself at the hospital with definite symptoms and pregnancy is present, pregnancy is not a contraindication to the operation.

"There is one other point about malignancy. I suppose the microscope might not determine that, but it seems to me that there is a great difference between the degrees of malignancy. I know that up until the past year my experience has been very favorable in cases of malignant tumor of the ovary. I have had several cases which I operated on where the patients have been under observation for several years and there had been no recurrence, but for the past year I have had the misfortune to have eight or

* For original article see page 209.

more cases of malignant disease, some carcinoma and some sarcoma, and in almost every instance there was a recurrence in a month or two, some of the cases were most promising ones, they were without any adhesions, without any breaking through of the capsule, without any metastases, as far as I could see, and in nearly all the cases a very radical operation was done, the uterus being removed entirely with the cervix, and, as I said before, within one or two months there was a very rapid recurrence."

DR. LEROY BROWN, in discussion, said: "If my memory serves me right, Herbert Spencer, when he came over here some years ago, presented a series of some forty cases of operations for ovarian tumors associated with pregnancy in various stages. The exact results I do not recall, but they were most favorable and the trend of the discussion at that time was in favor of interference when the tumor was of sufficient size to possibly interfere with pregnancy or the possibility of becoming twisted on its pedicle. Dr. Spencer divides the subject into those where the cyst is discovered during the early months of pregnancy, in these he operates at once. When discovered near the close of gestation he prefers to operate as near that period as possible. In my own personal experience I recall but one case of carcinomatous degeneration of an ovarian cyst. That was in my service three years ago. It was associated with a fibroid. There was a complete operation and within a year and a half there was an extensive recurrence. At the time of the enucleation the cyst which was thin walled was ruptured. I felt that there might have been some implantation on account of the extensive metastatic involvement. In discussing the subject with Dr. Strong, our pathologist, who examined the primary specimen he expressed the very decided opinion that there was no true carcinoma, that the recurrence was entirely metastatic and that the peritoneum itself was abundantly able to take care of any possible cells that might be liberated at the time of the rupture of the cyst wall. At the time of the operation the intestines were well walled off by pads.

"Concerning one matter which does not come up under the paper, but which the doctor drew attention to, namely, the reopening of the abdominal wound without suppuration. This accident has occurred to every one of us. Reis, of Chicago, gave the only rational explanation as to how this occurs; that is, by the peritoneal sutures primarily giving way, not under distention, but through the effort of vomiting or coughing; sudden pressure thrown against the wound, the peritoneum separates, a knuckle of intestine gets between the two layers and acting as a wedge completes the separation of the wound. Since my attention was called to Reis's paper, I have uniformly followed the custom of introducing stay sutures of silkworm gut in addition to the layer sutures and have never had any subsequent opening. I always leave the stay sutures in fourteen days, except in a Pfannenstiel incision when I take them out at the end of about a week. As to whether the character of sutures used in the layer approximation will influence the likelihood of a subsequent reopening, it appears that even where

silk is used this accident occurs, as in the case reported by Dr. Brettauer, our president."

DR. W. S. STONE, in discussion, said: "As the other speakers have said, the parts of the paper read limit the discussion to only a few points. The remarks of the last speaker, regarding the protection afforded by the normal peritoneum against the dissemination of cancer, relates to a factor in metastasis about which there has been much discussion. In connection with this subject, I recall a case recorded in the literature, in which during an operation for the removal of an apparent primary cancer of the appendix, an ovary was found the seat of cystic degeneration. The cysts were punctured and within a few months that ovary presented a cancerous growth."

"It is interesting to note how relatively few cases are reported in which the uterus is involved at the time of operation, although not infrequently one of the clinical symptoms has been menorrhagia. On the other hand, amenorrhea is also a frequent symptom, which is of some clinical significance, if we consider how many malignant tumors of the ovaries are bilateral. It is also worthy of mention that a very large number of these cases occur during the functional life of the ovary, especially near the age of thirty.

DR. HOWARD C. TAYLOR, in discussion, said: "I want to express my appreciation of the doctor's paper. I have been particularly interested in the number of cases of dermoid cysts which showed signs of malignant degeneration, and it is one more reason why all ovarian cysts should be removed. In case of small ovarian cysts there is no way of knowing of the malignant condition except by removing it. There is no way previous to operation by which we can tell whether a cyst is benign or malignant. Therefore, the side of safety would be to remove all ovarian cysts as soon as they are diagnosed. It would be of interest to know the end results of the cases of malignant degeneration of dermoid cyst. The number of cases of cancer that are permanently cured is relatively small and it would seem as if these reported by Dr. Wiener have been cured, and it is a pity that we cannot have a record of that.

"As to ovarian cyst associated with pregnancy, I do not think an ovarian cyst should always be removed under such conditions. There is, however, a definite risk in leaving such a growth. I have seen a number of cases sent to the hospital with disturbance of those cysts directly after delivery, requiring immediate operation. I think that in most cases the removal of the cyst would be on the side of safety."

DR. S. WIENER, in closing the discussion, said: "In answer to Dr. Studdiford's question about the apparently large number of cases of malignant disease, I want to say that I think that would be a little plainer in reading the paper. I did not mention how the bilateral cases were classified. Now, a large number, indeed the majority of the carcinoma cases were bilateral and I just took occasion to look it up. Under the general classification I think I said that there were twenty-four cases of carcinoma. There were

eight which were bilateral, so that reduces the number of operations for carcinoma of the ovary to sixteen out of 240 operations.

"Dr. Vineberg and Dr. Brettauer have been kind enough to help me out on the reasons for operating these cases during pregnancy, but as I recall it in going over these histories (and I made an abstract of each history) there were very definite symptoms in each case. In the hospital there are no accommodations for cases of pregnancy. In the admitting room cases of pregnancy are excluded along with tonsillitis, measles and smallpox. What I mean to bring out is the fact that there must have been some marked symptoms (and I recall that in most of these cases most frequently pain was present) for their admission.

"I don't think that I stated in the paper that every ovarian tumor should be operated during pregnancy. I think I stated that every ovarian tumor which by its size or location threatened serious complications in labor, should be operated.

"In regard to Dr. Taylor's remarks relative to the subsequent fate of the cases of carcinoma, particularly the dermoid cases, I wish to say that it is practically impossible to trace these patients for the reason that they move from one tenement house to another and there is no record that can be kept of them."

DR. W. M. FORD presented a case of

HYDATIDIFORM MOLE, CHORIOEPITHELIOMA, AND BILATERAL CORPUS LUTEIN CYST.

Mrs. M. G., an Austrian, was twenty years old when admitted to the Woman's Hospital on the first of May, 1914. She first menstruated at sixteen and regularly thereafter every lunar month for six or seven days. Her marriage, two years ago, resulted in no evidence of pregnancy until four months ago when she ceased menstruating. Seven days previous to admission she noticed a slight bloody discharge which lasted only one day. Subsequent to this her abdomen increased rapidly in size until at the time of admission the uterus indicated that she was about at term. She was bleeding freely and suffering a great deal with abdominal pains. Under a general anesthetic she was dilated manually and about 1 quart of hydatidiform cysts were evacuated and the uterus was packed with plain gauze. I quote in part the pathologist's report upon what was removed.

Hydatid Mole of Placenta. "*Macroscopical*.—Received a large amount, approximately $1\frac{1}{2}$ pints, of vesicles and blood clot. The hydatids measure from 2 mm. up to 1.5 cm. in diameter. Placental tissue is also present and this also contains many small hydatids. The placental tissue appears rather poorly preserved.

Microscopical.—Amniotic membrane with an edematous stroma. Number of edematous villi without any pathological changes. Several syncytial buds. No solid portion of the placenta in the section. No sign of malignancy."

On May third the packing was removed. The uterus at

this time was distinctly enlarged and flabby and during the next few days the patient passed numerous large blood clots. On the 21st of May the uterus was still flabby and she was continuing to flow. At this time the patient was again curetted and packed for twenty-four hours. I quote the pathologist's report on the second cureting.—“Decidua Compacta. Spongiosa and Fetal Placental Tissue.”

Macroscopical.—Received fairly large amount of curetings.

Microscopical.—The curetings show the empty lumen of largely dilated uterine glands in the state of pregnancy (decidua spongiosa). Besides this we find local decidual reaction in strips of compact decidua. Large masses of syncytial cells surrounded by fibrous masses. Small amount of trophoblast.

The patient continued to bleed and to lose strength. (May 28, 1914, red blood cells 3,600,000, hemoglobin 74 per cent.—June 5, 1914, 18,500 polys 78 per cent.) On June 6, a double hysterosalpingophorectomy was done for large multilocular ovarian cysts. The patient made an eventless recovery. The pathologist's report upon this specimen is interesting.—Chorioepithelioma. Lutein cysts both ovaries.

Macroscopical.—Uterus $10 \times 6 \times 8$ cm. including a cuff of vagina and adnexa. The uterus is uniformly enlarged, the myometrium being 4 cm. in thickness at fundus. On opening the uterine cavity several shreds of detached and loosely attached pearly gray tissue are seen; at the right uterine tube corner is an area 1.5 cm. in diameter where the myometrium appears invaded by spongy tissue, apparently arising from the endometrium, several clear cystic cavities appear in this. The endometrium of the left tube corner appears velvety and hyperplastic. In several places of the corpus uteri the loose or semidetached tissue previously described appears to be slightly invasive. Adnexa of the right side present a tube of normal outline, ovary being replaced by thin-walled multilocular cyst with clear serous contents, size of fist.

Adnexa of the other side are also converted into a large cyst. This holds approximately 500 c.c. of a highly albuminous fluid, which shows clotting in portions, and small old blood clots.

Walls are smooth externally and internally, no papillations. Here we find also the tube attached by a normal mesentery, walls are thin and straight, fimbriated extremity open. One section of this cyst shows a minute body, apparently a fairly fresh corpus luteum.

Microscopical.—The mucosa of the fundal region shows large masses of syncytial cells which have invaded the myometrium diffusely. Many syncytial giant cells isolated between the muscular fibers. There are masses of chronic cells deeply invading the myometrium. Cyst walls show markedly hyperplastic lutein cells.

DR. L. W. STRONG, in opening the discussion, said: “Dr. Ford's case is interesting on account of its completeness, having both the mole and chorioepithelioma and lutein cysts (bilateral lutein

cysts). The mole and cysts were presented but the chorioepithelioma was not because the specimen is very much cut up and there is really nothing to see now.

"The interest in the lutein cyst is, of course, its relationship to the mole in that it regresses on removal of the mole. The lutein cyst is not the cause of the mole but rather the reverse, as is shown by the reversion of the cyst. The influence of the mole is that of stimulation of the lutein tissue. It is a general hyperplasia of all the lutein material of the ovary and after the removal of the chorioepithelioma or of the mole, this regresses. There is, of course, in pregnancy, general hypertrophy of the lutein tissue. These cells are theca lutein cells. A hydatid mole is nothing more than an hypertrophy of chorionic villi. This intensified process so stimulates the normal lutein hypertrophy that there are always lutein cysts in these cases, although they may not be of macroscopic size and may not be obvious at once. In this instance they were, of course, very large."

DR. JOSEPH BRETTAUER, in discussion, said: "Did I understand Dr. Strong to say that lutein cysts are always present with the mole?"

DR. L. W. STRONG.—"Yes."

DR. JOSEPH BRETTAUER.—"The idea that the mole causes the lutein cyst is quite the reverse of what was accepted ten years ago."

DR. L. W. STRONG.—"Yes. I think this is the accepted theory to-day."

DR. R. T. FRANK, in discussion, said: "In reference to that very point: as I recall it, Dr. Ford said this patient was only twenty years of age (Dr. Ford stated that Dr. Frank was correct in his understanding). Considering the history of the hydatidiform mole, the removal of the uterus for chorioepithelioma and the extreme youth of the patient, the question might very well arise as to whether it would not have been advisable to have left one ovary in spite of the apparent risk, because, as Fraenkel of Breslau, has shown, there have been some five or six cases in which these lutein cysts had regressed, where ovaries that had reached the size of an adult fist had become perfectly normal in size after the irritative factor (the chorioepithelioma or the hydatid) had been removed."

DR. H. N. VINEBERG, in discussion, said: "We have had quite a number of cases of chorioepithelioma. Most of my cases were preceded by molar pregnancy and I am very much astonished at the statement made by Dr. Strong that lutein cysts are always present, if not microscopically at least macroscopically. I know of one case in which the pathologist at Mount Sinai Hospital reported a total absence of lutein cysts. There were lutein cells, but no cysts, not even microscopically. The ovaries apparently were perfectly normal in size."

"The case reported to-night was, to me, very interesting. One of the cases that I had was in a young woman twenty years of age in her first pregnancy."

"As to the retrogression of lutein ovarian cysts: I had a case in the hospital where I could feel at the time I emptied the uterus for a hydatidiform mole, two good-sized cysts each about the size of a closed fist. The patient was kept in the hospital for three weeks, during which time she continued to have pain. There was no sign of regression, so much so that I finally had to operate and remove the two cysts and apparently, as far as the naked eye was concerned, there was no solid tissue to be seen. They were simply a thin-walled cyst, excepting that they were multilocular. As far as one's own common sense would lead him to suppose, it does not seem possible that these cysts which I had to remove could possibly have regressed and the ovarian tissue reform."

DR. H. C. TAYLOR, in discussion, said: "I didn't hear the whole of Dr. Ford's paper. Am I correct in understanding that the diagnosis of chorioepithelioma was based on the curetings or after the uterus was removed?"

DR. W. M. FORD, in answer to Dr. Taylor's question, said: "The diagnosis was not made until the pathologist had the tumor, but it was suspected from the fact that the patient continued to bleed and was running downhill rather steadily after two curetings."

DR. W. M. FORD, in discussion, said: "In reply to Dr. Frank, I beg to say that the abdomen was opened for large masses in the abdomen and because the patient was not making satisfactory progress without such a procedure being undertaken; at that time, chorioepithelioma was suspected. It was deemed advisable to do a hysterectomy and as the lutein cysts of the right ovary were as large as a small head of cabbage, I determined to remove the right adnexa with the uterus. Assuming that the left ovary might recover and that the interests of experimental medicine might be served by leaving that structure *in situ*, I was constrained to follow the course which in my judgment served the best interest of the patient. I therefore removed the left ovary. On the left side there was a cystic mass the size of a small orange. The cysts had apparently not regressed during the month that followed the curetings."

"Dr. Taylor asked for statistics of hydatidiform mole. I can only answer by saying that my experience has been limited to three cases. The first left the hospital after cureting and I have lost track of the case. The second occurred in private practice about ten years ago. I curetted the woman, she made an eventless recovery and within three years she was delivered of a full-term child and has been well since; and this third case, which developed chorioepithelioma, was the last of my very limited series."

DR. L. W. STRONG, in discussion, said: "I would like to say that these cysts are distinctly not cystomata; they are not tumors; they are not neoplasms; and that they may well be expected to regress; and while I cannot criticise Dr. Ford, I think that the cyst the size of an orange might have regressed."

DR. J. O. POLAK, in discussion, said: "I would like to ask if there is any way whereby we can tell at the operating-table which of these tumors will regress. I have had the misfortune some years ago

to do a hysterectomy on such a case as reported to-night and I took out both ovaries. They were multilocular shells. Speaking in comparatives, one was about the size of a child's head and the other perhaps larger than an ordinary grape fruit. I had the ovaries examined and it was found that they were lutein cysts I was unable at that time, to distinguish them from multilocular cysts. They had all the appearance of a multilocular ovarian cyst and it was for that reason I took them out, as well as the uterus."

DR. H. N. VINEBERG, said: "In answer to the question asked by Dr. Taylor I wish to say, according to recent statistics, there are 16 per cent. of hydatidiform moles that become chorioepithelioma and 50 per cent. of chorioepitheliomas are preceded by hydatidiform moles."

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of Thursday, March 4, 1915.

The President, DANIEL LONGAKER, M. D., in the Chair.

DR. D. J. MCCARTHY (by invitation) read a paper on

THE NEUROSES AND PSYCHOSIS OF PREGNANCY AND THE PUERPERIUM.

DISCUSSION

DR. JOHN A. MCGLINN.—It strikes me that the statistics given in this paper are not of definite value because of the great variability of statistics in general, and I question how much etiological importance should be attached to certain conditions mentioned; for instance, a woman illegitimately pregnant would, I think be more likely to show mental change in the puerperium than a woman legitimately pregnant; and yet, in my service at St. Vincent Hospital where practically all our cases are those of illegitimate pregnancy, the psychoses of pregnancy are extremely rare conditions. It is rather striking upon going into the wards and private rooms of the girls sequestered there to see how cheerful they are in spite of their pregnant condition. I think we are all agreed that in the toxemias of pregnancy changes in the mental condition are apt to occur. The question arises whether the insanities and neuroses are more common in the toxemias and infections of pregnancy than in toxemias and infections apart from pregnancy. In the gynecological and obstetrical service of the hospitals we have many cases of profound infection and yet we see relatively few cases of mental depression in these cases of toxemia and in cases of infection brought into the hospitals. I wonder whether there must not be a soil for the implantation of these mental changes added to the physical condi-

For original article see page 269.

tion; and whether an otherwise perfectly normal individual having an infection, will develop the insanity of pregnancy unless there is not in the first place a low mental balance.

DR. HENRY BEATES.—Upon the point raised of whether or not insanity can be ascribed to the "twilight sleep", I can speak only from the point of view of general surgery. I would advance the proposition that if small doses of scopolamin hydrobromide or hyoscin hydrobromide would produce insanity, it is a rational conclusion that profound narcoanesthesia effected by the administration of much larger doses of scopolamin and morphine would be followed proportionately by psychoses. For about twelve years the surgery I have done has been conducted with the use of hyoscin plus ether. By degrees until about one year ago I used less and less of ether. For the past year I have used no ether. The method of narcoanesthesia which I use is that employed by Dr. Wayne Babcock, with some slight modifications: a fiftieth of a grain of scopolamin hydrobromide, and one-sixth of a grain of morphine is administered hypodermically at half-hour intervals for three doses. According to the susceptibility of the patient to the morphine, the third dose of scopolamin is administered with or without the former. There is administered by the rectum 2 ounces of whiskey and 1 ounce of the compound spirit of ether (Hoffmann's anodyne) at the time the third hypodermic is given. In the last six months the following operations have been done by me with that method of anesthesia. Three radical operations for carcinoma of the mammary gland; two complete hysterectomies; one splenectomy. Dr. Righter amputated a leg at the upper third of the femur for diabetic gangrene. He also did a nephrectomy for tuberculosis. I have done twenty-seven appendectomies; one cholecystectomy; two cholecystotomies; one operation for cancer of the prostate; several plastic operations; trachelorrhaphies, perineorrhaphies, anterior colporrhaphies for cystocele and procidentia; two suspensions of the uterus, radical herniotomies (inguinal), and to-day I operated for gangrenous appendix with abscess in which I introduced four gauze drains in the loin and a tube and a suprapubic drain. The patient went on the table with a temperature of 100; pulse 88, and when I saw him at half past six this evening the same conditions prevailed. In no case was there any mental disturbance whatever. There was conspicuous absence of shock in all cases. This was so marked that I believe much of surgical shock is due to the wear and tear of the nervous system in concluding to submit to major operations. Patients do not rouse from this narcoanesthesia for from three to seven hours, after which they wake up free from the nausea and vomiting so commonly following ether anesthesia. In three of the instances a second radical operation for carcinoma of the mammary gland was done and the patients enthusiastically praised the superiority and comfort of this form of "anesthesia" over ether. With the exception of one case of cholecystectomy in which deep drainage was necessary, there was no untoward postoperative suffering whatsoever. I think with this series of cases, emphasis is given to the point made in the paper of the

President that the idea of psychoses being ascribed to scopolamin is erroneous.

DR. ALICE WELD TALLANT.—In reference to the matter of puerperal insanity and the part which illegitimacy has to play as an etiological factor, I may say that in my experience in the last ten years at Sleighton Farm in which we receive many girls pregnant and many who have been pregnant, we have had no case of psychosis or anything approaching insanity in any of these girls. In the Maternity of the Woman's College Hospital we have also had a number of illegitimate pregnancies and we have not found any tendency to psychosis among them. In relation to heart conditions, we have recently had in the hospital a case of mitral stenosis with accompanying mitral insufficiency. The patient was in distinctly bad condition for any sort of prolonged labor or operative procedure. The duration of the heart lesion was not known, but when she came into the hospital she had dyspnea, rapid pulse, and swelling of the feet, with suggestive symptoms of syphilis and a Wassermann four plus. She had some mental confusion; she was not illegitimately pregnant. She was very unwilling to remain in the hospital when we suggested having labor induced, since the child was viable, but insisted upon going home. Fortunately for her, labor pains began before she could go and she was delivered spontaneously. The child was small, weighing 3 pounds and 15 ounces, but even with that very quick and easy labor, the few straining efforts which she made had put the woman into a state of extreme cyanosis which was most alarming when she was brought into the delivery room. In these cases of actual loss of compensation we can seldom allow the woman to go on to full term. I feel that she should be tided over until the child is viable and labor induced.

DR. GEORGE M. BOYD.—I wish first to express my appreciation of the splendid paper of Dr. McCarthy, and while it is a review of what we have been teaching regarding the insanities of gestation and of the puerperium, it is particularly interesting to note the decrease in the insanities of pregnancy in Blockley. It would be interesting to know more of the decrease in the insanities of pregnancy and the puerperium brought about by the better hygienic conditions in the work at Blockley. The favorable prognosis is a review also of our teaching. Seventy-five per cent. of all cases recover. I agree with the reader of the paper concerning interrupted pregnancy in cardiac conditions, that such patients do not bear labor well and that it is essential to assist them. I should like to ask Dr. McCarthy his feeling about the use of hyoscin and whether in its action it differs from scopolamin. The report of Dr. Beates carries us back to the days of preanesthesia. He tells us of remarkable anesthesia produced by a drug.

DR. ALFRED J. OSTHEIMER.—I have little to add to the discussion outside of the fact that our experience in the psychopathic wards of the Philadelphia Hospital confirms Dr. McCarthy's statement that there has recently been a considerable decrease in the insanity of the puerperium. Within the past year but six cases have been admitted: one of acute mania, one of mania with delusions, and four of melancholia

with delusions. In three of these there has been insanity in the ascendants. One case recovered in seven months, the other five cases are still being treated in the Philadelphia Hospital for the Insane—one case for the past six weeks, one for ten weeks, one for five months, one for seven and one-half months, and one for nine months.

DR. D. J. MCCARTHY.—I did not mean to refer to illegitimacy in pregnancy as an etiological factor in insanity, except to mention that in some of the cases the sensitive feeling of the girl might be a factor in mental change. Statistics show us that the percentage of illegitimacy in Scotland is large. Flexner in his book on "Prostitution in Europe" states, as I remember it, that about 25 per cent. of all births in Germany are illegitimate. Bevan Lewis of the West Riding Asylum does not give any difference in the insanities in legitimate and illegitimate births. In the infections we are dealing with a definite specific subject and not considering the reverse condition of the development of mental disease as a result of intoxication in general, and are looking for the cause that produces the psychosis. The most important question in the study of these cases is to determine the general condition. We can then estimate the effect which will be produced by conditions in the pelvis.

I believe the increase in insanity in America is more apparent than real. Because of the general improvement in the institutional care of patients there is a greater tendency to send them to asylums for treatment. Were we able to get absolute facts we would know that the actual increase is relatively slight.

DR. WILLIAM E. PARKE read a paper on

THE CESAREAN OPERATION.*

DISCUSSION

DR. STRICKER COLES.—Cesarean section will save the lives of many mothers and babies; but at present there seems to be a tendency to resort to it too frequently. To get the best results, the operation must be performed before undue interference—but there are many cases, which, when properly conducted, will result in normal delivery. The obstetrical art must not be entirely abandoned!

I have lost in subsequent pregnancies, two patients previously delivered by Cesarean section, both having made excellent recoveries. The first was found dead in bed four hours after an easy forceps delivery; the second died from intestinal obstruction at about the thirty-sixth week of pregnancy. She had reported at the hospital for induction of labor, and was told to return in two weeks. Ten days later she was sent to the hospital by her attending physician in a serious condition. Dr. Boyd saw her with me, and we did not deem an operation advisable. I was unable to get a postmortem on either of these patients, but I believe that in both cases the previous operations were in some degree responsible for death.

DR. J. W. FITHIAN.—I have been much interested in the paper of

* For original article see page 281.

Dr. Parke. In so many of these cases treatment is a matter of judgment in the individual conditions. In placenta previa the operation is being done almost exclusively by some doctors and yet it is hard to tell which will recover from delivery by the natural route and which by Cesarean section. Some cases admit of no argument; the condition being that of a tumor obstructing the birth canal. The question is a matter of judgment, experience and statistics. The various conditions will determine the procedure in the individual cases.

DR. JOHN A. McGLINN.—Further, in regard to Dr. Parke's paper, I think I would have sectioned every one of the cases he sectioned. In the majority of the cases of absolute or moderate obstruction I think Cesarean section is far preferable to high forceps operation which is apt to give much mutilation or a dead baby. I am using forceps less and less as I grow older. We cannot lay down hard and fast rules but study the cases individually. As a general rule, I do not believe eclampsia should be treated by Cesarean section. Unfortunately, the idea gets about that in all cases of eclampsia the proper thing to do is to empty the uterus as quickly as possible. The operation should be fitted to the case and not the case to the operation. In placenta previa I believe the majority of cases do better by Cesarean section, but to resort to this procedure in all forms of placenta previa is sheer nonsense.

DR. PARKE, closing.—In these two or three eclamptic cases it looked as if nothing would save the women, who were in a low comatose state having had many convulsions. I think delivery can be accomplished in nulliparous women with undilated cervixes with less shock by Cesarean section than by delivery through the natural passage. I would not think of doing section unless the environment were of the very best. That is an important factor. If the patients had been in private houses I would not have considered Cesarean section.

DR. DANIEL LONGAKER read a paper on

MITRAL DISEASE AND GESTATION.*

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

Stated Meeting, Held April 15, 1915.

The President, DR. WALTER B. JAMES, in the Chair.

This program was arranged by the Section on Obstetrics and Gynecology.

THE LOGICAL INTERPRETATION OF MENSTRUAL IRREGULARITIES.

DR. JOHN G. CLARK, of Philadelphia, presented this paper in which he considered the types of irregular metrostaxes grouped under the

* For original article see page 289.

terms menorrhagia and metrorrhagia. He stated that in the majority of uterine hemorrhages the source of the trouble lay in young individuals in the ovary and in adults, in the uterus. Observers had shown that both before and after menstruation there was a slight increase and then a decrease in the general metabolic activity, as shown in the respiratory rhythm, rise and fall in the bodily temperature, acceleration and then slowing of the pulse rate, and a greater, followed by a smaller nitrogenous output. After the cessation of the flow there was a rapid return to normal and then a state of physiological equilibrium obtained for about fourteen days, after which preparation for menstruation began again. Coincidentally, changes in the glands of the endometrium occurred; immediately after menstruation the quiescent gland was slender and more or less straight; later the lining epithelium underwent an active karyokinesis, gradually assuming the form of a columnar mucous cell, which elaborated more and more mucus, until the maximum was reached just before the flow began. The activity of the ovary governed the menstrual flow. The application of this cyclic law was of the greatest assistance in making a diagnosis between a malignant and a benign growth. In making a diagnosis of benign growths it must be remembered that irregularities of uterine bleeding practically never started as intermenstrual manifestations. One might safely say that the initial symptoms of a myoma or a polypus never manifested themselves as an accidental spotting of the patient's linen unless a preceding period of increasing flow at the regular menstrual epoch had occurred, whereas exactly the reverse was true of carcinoma. A malignant growth was never governed or materially influenced in the production of symptoms by the cyclic law. If one kept these facts in mind, a very logical deduction might be made in judging of the probable cause of amenorrhea or metrorrhagia. All bleeding that did not occur synchronously with the physiological menses was to be viewed with grave suspicion until it had been proven to be benign; on the other hand, a regular periodicity of flow with intervals of complete freedom from even slight bleeding or malodorous discharge might be regarded with equanimity so far as the diagnosis of cancer was concerned. In making a differential diagnosis in office practice the writer stated that in making a preliminary study of a case of suspicious uterine hemorrhage a slight degree of traumatism was employed during the stage of quiescence a flow of bright red blood might be precipitated if there was a malignant change, but if the bleeding was due to myoma, a polypus, or an endometritis, this would rarely be the case. He applied the test in the following way. The cervix was exposed with a bivalve or trivalve speculum, and its surface carefully cleansed with 1-1000 solution of mercuric bichloride. The speculum was then tilted slightly and filled with the solution until the external os was submerged. A uterine sound was then gently passed, under direct vision, never by touch, through the clear pool in the speculum into the cavity of the uterus. The sound was then gently rotated in all directions; after a complete circuit had been made it was gently withdrawn, and the external os closely observed for a

short interval. If a thin stream of bright blood trickled into the pool of clear fluid this might be regarded as highly suspicious of malignancy. Especially was this significant if it continued for some time after the manipulation. Such a case should at once be subjected to curettage and a microscopic examination made to ascertain the exact pathological condition. If the flow did not occur the evidence was strongly against malignancy. This sign, of course, was to be regarded only as a contributory means of arriving at a diagnosis and should not be regarded as conclusive. The method was to be employed only in a well-equipped office with good light and with the technic described.

DISCUSSION ON DR. CLARK'S PAPER.

DR. JOHN O. POLAK, of Brooklyn, said that Dr. Clark's able and lucid presentation had illustrated the relation of the histological and physiological processes to uterine hemorrhages. It seemed to him that only with a basic knowledge of these processes was it possible to properly interpret the clinical history and approach the subject of uterine bleeding with any rational understanding. The classification which he had brought out so well in his paper, practically divided all uterine bleeding into four classes, a point that it would be well for all of us to remember. There were two or three points that Dr. Polak wished to particularly emphasize.

If we will but recall some of the pictures thrown upon the screen and remember the normal processes and preparation for menstruation, we can readily understand how some of the excessive hemorrhages which occur at the menstrual period, are produced and Dr. Polak wished to call particular attention to the fact that many of these were produced by varicosities in the broad ligament. These hemorrhages were of a definite type, profuse and always attended with pre- and co-menstrual pain in each inguinal region and there can be found an explanation why the woman who had had, for instance, a twin pregnancy, or multiple pregnancies, or is of the ptotic type, was subject to excessive menstruation because of varicosities in the broad ligament.

With regard to the class of hemorrhage that occurs during the later years of a woman's life, when she approaches the menopause, here there is encountered a new change, a hyperplastic change, in the tissues which surround the blood-vessels; the blood-vessels cannot retract and go through the normal hemostatic process. We should always keep in mind that every menstrual period is attended by a premenstrual—a period of active hemorrhage congestion and involution of the endometrial layer. If one keeps this in mind we can see how changes in the blood-vessels in the wall of the uterus and in the endometrium were bound to produce pathological conditions.

Dr. Polak said that it was interesting to notice how cancer differed in its effects on the endometrium from the physiological process. He wished to thank Dr. Clark for the suggestion that cancer was a corrosion process—this term made the difference between pathological physiology and malignant changes clear.

DR. LAWRENCE W. STRONG was much interested in Dr. Clark's presentation but the title was somewhat misleading. He thought that something would be said regarding certain structural changes, something brought forth that would be more or less characteristic of the uterus itself in the so-called idiopathic hemorrhages. He was glad to find that Dr. Clark had laid so much stress upon the ovary and that the structural changes were mostly conspicuous by their absence. The vessel changes were not characteristic in these hemorrhages. Dr. Schwarz who worked with him in his laboratory had showed that in menorrhagic uteri such changes were not at all characteristic.

With regard to the endometrium, changes which had been regarded as characteristic had also been shown not to have any real causative relationship. Myomata, carcinoma and local causes might be responsible for the hemorrhages; regarding this there could be no question. But regarding idiopathic hemorrhages, no structural changes had been demonstrated.

DR. ROBERT T. FRANK said that he was much interested in Dr. Clark's paper but he was slightly misled, as Dr. Strong had been, by the title. The exposition of the subject under consideration he considered masterly and the slides presented were unusually beautiful.

To what Dr. Clark had stated on the clinical side of the question, Dr. Frank said he had nothing to add or subtract. He was perfectly in accord with what had been said regarding malignant tumors of the uterus. But when it came to an explanation of the cause of hemorrhages occurring in fibroids, idiopathic hemorrhages in the young, as well as those occurring at the climacteric period, he agreed that the ovary was the trigger and the uterus was the gun. But the smokeless powder had not been mentioned. He thought that to-day, while research work anatomically and physiologically was extremely important and of great interest, their attention should be turned to the chemical phase of the subject. Dr. Frank said he had brought a few slides with him which he wished to have thrown on the screen.

These slides were shown to illustrate the fact that the uterus—both musculature and mucosa with all their components—responded to chemical stimuli. Therefore the anatomical and morphological study of *minutæ* was love's labor lost.

There were here thrown on the screen a menstruating mucosa and one from a menorrhagia case. Neither was distinguishable from the other. To illustrate response to other stimuli the mucosa from a puberty case of bleeding (cystic endometrium), of a dysmenorrhea membranacea and of a uterine cast in ectopic pregnancy were demonstrated. Changes in the musculature and mucosa were best illustrated by the rabbit uterus preparations. Here on one lantern slide were shown the uteri of rabbits of the same weight. In each case the animal had been castrated, and except for the controls, injected with potent placental and corpus luteum extracts. Depending upon the number of injections and the extracts used, varying degrees of hypertrophies in the muscle and the mucosa had resulted.

The time has now arrived to direct our attention to the motive cause of the uterine changes. Whether fibroid or idiopathic hemorrhages, castration produced amenorrhea and involution. As soon as we understand the *ovarian changes*, the uterine will become clear, and minor variations in vessels, muscle or mucosa of subsidiary importance.

DR. J. F. PERCY of Galesburg, Ill., presented a paper on

THE TECHNIC OF APPLYING HEAT IN THE TREATMENT OF INOPERABLE
UTERINE CARCINOMA.*

DR. WILLIAM CLARK, of Philadelphia presented a paper on

THE USES OF DESICCATION IN GYNECOLOGY.†

DISCUSSION.

DR. HOWARD C. TAYLOR said that there was nothing more discouraging than the treatment of cancer of the uterus. He could not see the indication for the use of heat in cancer of the fundus uteri. In advanced cases with ascites and general abdominal metastases the case would be obviously inoperable and the abdomen should not be opened. In another class of cases, which are believed to be operable, but after the abdomen has been opened, metastases may be found in the liver, intestines or elsewhere but the uterus freely movable. In such cases the removal of the uterus in order to relieve local bleeding and discharge would be safer and more effectual than the use of heat. In still another class of cases of carcinoma of the fundus uteri, if the case is found to be inoperable on account of direct extension of the growth from the uterus to ovaries, intestines, etc., the removal of the uterus and also the use of heat would be contraindicated on account of the great risk and small benefit. The use of heat therefore is limited practically to carcinoma of the cervix.

With regard to carcinoma of the cervix uteri all appreciated the value of the application of heat in some inoperable cases. The most advanced cases, are beyond relief and should not be touched. Some inoperable cases are so greatly benefited by the application of heat that the uterus becomes movable and the case is operable. He asked Dr. Percy what he would do in such cases, would he perform an hysterectomy or would he rely on the application of the heat.

Dr. Taylor was very anxious to learn more about Dr. Percy's statistics regarding the cures and the prolonging of life in these advanced cases of cancer.

DR. HERMANN J. BOLDT said that when the late Dr. Byrne called attention to the heat treatment of cancer of the cervix uteri he was much impressed by it as were others and he then used it quite extensively and had continued to use it. After Dr. Percy had demonstrated his technic to him about a year ago, he had come to the conclusion that the main feature in the treatment was the opening of the

* For original article see page 298.

† For original article see page 63.

abdomen, thus enabling one to do more exact and efficient work. In his opinion this was the only way in which such good results could be obtained.

So far as the difference between the application of high or low heat was concerned, from the clinical aspects, he was not at all satisfied that the application of the low degree of heat was any better than the application of a higher degree of heat, because, in his experience, the clinical results had been practically the same. He had not found any difference at all. The cause of death when the low degree of heat was employed was by septic infection in one of his cases that only died to-day, eight days after cauterization. The autopsy had not yet been completely reported to him. On the fourth day after the application of the heat there was secondary sloughing and a vesical fistula developed which was quite large. Dr. Boldt could see no reason, from a clinical point of view, for believing that the application of the low degree of heat was more likely to cause bleeding than the higher degree. With the application of the high degree of heat he had had one fatal case caused by secondary hemorrhage. They wanted to hear more exact and definite details as to results.

DR. GEORGE H. MALLET said that it had been his privilege to assist Dr. Percy in his operations at the General Memorial Hospital that afternoon. With very few exceptions all of the cases of uterine cancer referred to that institution were incurable and considered inoperable. Dr. Percy's procedure for their relief and palliation would be a valuable addition to their treatment of that class of cases. He saw Dr. John Byrne perform his galvanocautery operation for cancer involving the cervix and uterus, in this same operating room in 1896. He used a portable battery which seemed to them complicated and unreliable. For years they had used the Pacquelin or some form of electric cautery and found them open to the objections that Dr. Byrnes claimed, namely: the difficulty of keeping the platinum at a low temperature, and the prevention of injury to the surrounding parts by heat radiation. By his instruments Dr. Percy had overcome both of these difficulties and had put this valuable agent upon a more scientific basis by his advanced and carefully worked out technic. The case Dr. Byrnes operated upon at the General Memorial Hospital had a hemorrhage on the third night, but recovered, and he had heard that she was alive and well last year or eighteen years after the operation. In the cases this afternoon the uteri were fixed by infiltration in the cellular tissue and by masses in the parametria. With his hand upon the uterus in the abdominal cavity, it was surprising to feel these masses oozing away by the heat applied in the cavity of the uterus, and to feel how movable the uterus became. It was surprising to him that Dr. Percy did not apply this method of treatment to the early or operable cases for if as he said, it would kill the cancer cells at a distance of 2 or 3 inches from the heating iron, it would destroy all cancerous tissue in the uterus and the parametria as well, and thus avoid the necessity of extensive hysterectomy with its high mortality.

DR. LEROY BROWN expressed the belief that the technic of the

application of heat for the treatment of uterine cancer as suggested by Dr. Percy was a decided improvement over other methods of heat application which they had previously used. In former methods where the abdomen was not opened there was a knowledge on the part of the operator that cautery ends had gone through uteri and as a result patients had died. For this reason the operator was careful, as a rule too conservative, in stopping short of the cauterization needed, or of the cauterization that was possible.

With his own hands or that of his assistant grasping the uterus and the surrounding structures through the abdominal incision his work with the cautery iron was far more accurate and thorough.

Dr. Percy's suggestion of low black heat applied for a considerable length of time he also believed to have greater penetrating power than the previously used hotter dull red heat used for a shorter time.

The selection of the kind of inoperable cases in which this method should be used was of much importance. The value of the black heat or as Dr. Percy called it, the "cold iron" method consisted in its deep destructive penetration. On this value rested the danger. The slough resulting from the use of the cautery began to separate within a week or ten days. The effect of the cauterization might have extended beyond the uterine artery or even the bed of the ureter. Under such conditions sloughing of the ureter might occur, although to the speaker's knowledge such an occurrence had not been reported. Also sloughing and delayed hemorrhage from the uterine artery might occur, as had occurred in several instances. Percy reported four deaths from such a cause and the speaker was aware of another, and also of several instances of profuse delayed hemorrhage. With this knowledge the cases in which the Percy method of cauterizing should be used should be carefully selected in order to avoid, as far as possible the likelihood of such complications. Personally, Dr. Broun said he preferred to limit the choice of such cases to those in which the cancerous involvement was still confined to the cervix, and in which there was induration of the bases of one or both broad ligaments. When the involvement extended beyond the cervix there was a strong possibility of the effects of the effort to do thorough work involving the uterine artery and resulting in a late arterial hemorrhage. Vaginal packing with styptics was their only means of controlling it. This must necessarily be done under trying circumstances. The possibility of this late hemorrhage Dr. Broun said he confessed that he dreaded.

The suggestion of tying off the anterior trunk of the internal iliacs as a preliminary step to cauterization in order to avoid the possible late hemorrhage from the uterine artery the speaker did not regard with favor since there were too many important subsidiary vessels involved in ligating this vessel. In view of Dr. Percy's telling them that he had ligated this trunk sixteen times without complications his objections could have no weight.

The suggestion of tying off the uterine artery as a preliminary step he had never done, but this might be an addition. The only objection was the necessary dissection in order to separate it from

the underlying ureter and the possibility of suppuration in the separated areas as a result of the subsequent deep cauterization.

There was a class of uterine cervical cancer in which Dr. Broun said he regarded the Percy method as especially fitted. This was the nodular or ingrowing type as opposed to the papillary or cauliflower kind. In the first-mentioned class the metastases were early and recurrence after operation was unfortunately the rule. Patients with such conditions rarely came to the gynecologist until the condition was well advanced. In these cases he felt that the patient's interests were conserved in selecting complete cauterization as the line of treatment.

At the Woman's Hospital they felt under obligations to Dr. Percy for having personally supervised the making of a set of his instruments for the hospital. His technic was now used throughout the hospital to the exclusion of the older, higher red-heat method.

For that class of cases extending beyond the cervix and in which he hesitated to use deep cauterization he still had some hope in the desiccating electrical treatment as carried out by Dr. William L. Clark of Philadelphia and in the effect of the deep penetration of the rays of the Coolidge tube.

DR. PERCY in closing the discussion said:

"I am very grateful for the attention you have given my paper. I want to reemphasize what I said in the first paragraph, viz., that it is extremely difficult to describe my technic. The extensive application that I make of the heat is difficult to appreciate from the mere verbal description."

"Dr. Taylor asks about my statistics. I realize that this is the crux of the whole situation. But I am not ready to publish my statistics for the reason that I am dealing with a condition in which the mortality is 100 per cent. Practically all of my cases so far have been in the absolutely hopeless class. All I can say at this time is that this mass of hopelessness in which I have applied my technic, there is a respectable number that are alive months and years afterward with no signs of a recurrence of any sort. Increased experience is making the applications of my technic not only more effective but less difficult, and the results are becoming more encouraging. In the last two years an increasing number of surgeons have interested themselves in my technic and the reports from their clinics are substantiating any claims that I may have made. The results in my early work were mostly palliative. I did stop hemorrhage and pain and the offensive discharge, but I used a cauterizing temperature and thus failed to get the maximum penetration of heat which is the absolutely essential thing."

"Cancer of the fundus which has been referred to by Dr. Taylor, is a rather rare condition. But I have had cases where the utero-cervical junction apparently was alone involved. I have applied the heat and have had these cases return in one or two years with a recurrence in the body of the uterus. This is the type of case that would apparently justify a Wertheim or panhysterectomy in four or five months following my technic. However, I have reports of

twelve cases from leading clinics in this country where all the tissues thus removed have been worked up in serial sections and no evidence of carcinoma found. I am sure that we will all agree that these twelve extensive operations were unnecessary ones. My personal objection to a Wertheim or a panhysterectomy is based on my experience with the recurrences that come to me after these operations have been performed. There is not enough tissue left in which to develop heat without too extensive destruction. If a Wertheim or a panhysterectomy is done, I am sure that it should only be done after some months following the application of the heat by my technic."

"I am glad that Dr. Boldt emphasized the importance of opening the abdomen, as an essential and valuable part of this technic. I cannot agree with him, however, that it makes no difference whether one uses a high or low degree of heat. My experimental work absolutely settles the question in favor of the low degree of heat. With the high degree of heat it is absolutely impossible to make movable the fixed malignant tissues of the pelvis. The high degrees of heat form a charcoal core about one-eighth of an inch thick and three-fourths of an inch in diameter which is as stiff as a piece of sewer pipe. This leaves the greater part of the gross mass of cancer in the pelvis uninfluenced by the heat, and in addition, prevents drainage which is dangerous to the patient because of the excessive absorption of broken-down cancer cells."

"We cannot get away from the fact that this technic is the only one that does destroy the gross mass of cancer at one sitting. It leaves the patient to be treated for the small points of metastases that may be left by any of the many recognized methods of treatment, operative, x-ray, radium, or serums. But more than all else, it permits, I believe, the acquired resistance which has slowly but insufficiently developed during the destructive progress of the disease to assert itself; and which can and does, in many cases, clear up the remote but small points of metastases not reached by the primary applications of the heat."

REVIEWS.

TEXT-BOOK OF MEDICAL JURISPRUDENCE AND TOXICOLOGY. By JOHN GLAISTER, M. D., D. P. H. (Camb.), F. R. S. E., Professor of Forensic Medicine and Public Health in the University of Glasgow, etc. Third edition. Pp. 857, with 137 illustrations and one colored plate. New York: William Wood & Company, 1915.

As a work on medical jurisprudence this volume is, of course, written primarily for British readers. Its chief interest to others lies in its description of means of personal identification including the Bertillon and finger-print systems, the signs of death from various causes, the description of wounds, the study of blood and other stains, and the chapters on infanticide and on sexual functions and

crimes. The section on toxicology is of particular value. Like that on medical jurisprudence it contains many illustrative case reports. The present edition is a revision rather than an enlargement of its predecessor.

INTERNATIONAL MEDICAL ANNUAL. A Year Book of Treatment and Practitioner's Index, 1915. Thirty-third year. New York: William Wood & Company.

The current issue, delayed by the war, opens with a brief glossary of new medical terms. In the next section, the dictionary of remedies, especial reference is made to blood transfusion, salvarsan, phylacogens and pituitary extract. It is stated that there are distinct indications in the literature that belief in vaccine therapy is on the wane. A chapter on radioactivity and electrotherapeutics follows. The bulk of the volume is nominally devoted to articles on new treatment, but actually contains many on pathology, symptomatology and clinical tests. Of interest at the present time are the two chapters on military and naval surgery. The work is illustrated with seventy-one plates and ninety-six other illustrations. Its scope is treatment in all branches of medicine and surgery.

BRIEF OF CURRENT LITERATURE.

Puerperal Streptococcic Infection and Antistreptococcic Serum.—Ferruccio Pazzini (*Ann. di ostet. e gin.*, March, 1915) states that according to some authors the injection of antistreptococcic serum is the rational treatment of puerperal septicemia, but unfortunately clinical results have not justified this opinion. If the disease was always caused by the same streptococcus the treatment would be easy, but there are so many varieties of streptococci and the same germ varies so in virulence that the stock polyvalent sera do not always give the good results that should theoretically be obtained. The hemolytic streptococcus has been styled the cause of puerperal infection, but any streptococcus may become hemolytic when in the proper medium. In the hospital at Livorno the author treated twelve cases of puerperal septicemia with serum in the last three years, using the polyvalent serum of the Tavel Institute. His conclusions are these: the antistreptococcic serum of Tavel has only an initial effect on the patient. Its action is not durable whether the use of the serum is delayed, or only a small amount is given, or it is given in large amount, and prolonged for several days. There are modifications in the temperature curve and general condition after the first injection lasting for twenty-four to forty-eight hours only. Serotherapy is demonstrated to be harmless to the kidneys and other organs. It is desirable to use serum in every case of severe septicemia and if possible to reach results that are positive in all cases. Symptoms of intolerance such as headache, erythema, and arthralgia are not contraindications for its use.

Inflammatory Lesions of the Adnexa and Pregnancy.—E. Ferroni (*Ann. di ostet. e gin.*, March, 1915) says that it is well known that inflammatory lesions of the adnexa may complicate pregnancy; but observations of such conditions have not been frequently published. The author wishes to consider cases in which pregnancy has continued after the operation and in which a return of the pelvic lesions has not occurred after labor. The lesion may have existed before pregnancy, or have come on during pregnancy. He records twenty cases treated by himself. These cases he divides into two groups: first, forms of salpingo-oophoritis and perisalpingo-oophoritis, associated or not with pelvic peritonitis, and tending to regression or in course of regression. In this group are twelve cases, five with single or double annexitis, all with posterior pelvic peritonitis in regression: seven of annexitis and periannexitis, two accompanied by remains of a pelvic peritonitis. In all cases abortion occurred spontaneously at about the second month and it became necessary to extract the remnants of the secundines. Rest and medical treatment caused cure or improvement. The second group included cases of active inflammatory lesions of the adnexa and pelvis, with varying degree of intensity, or with active salpingitis. The inflammatory lesions were present at the time when conception took place, and resulted from some previous infection of recent or ancient date, gonococcic or tuberculous. The bacillus coli could not be excluded in some cases. In tuberculous cases there is always a possibility of a permeable tube with a lumen that can be traversed by the ovum. Undoubtedly, the percentage of conceptions in such cases is considerable. The existence of pregnancy seems to have no unfavorable effect on the lesions and they may be improved during pregnancy by antiphlogistic treatment, just as if no pregnancy existed. Pregnancy may even appear to be a favorable element in the treatment of such lesions. The forms already tending to improvement, and those characterized by salpingitis, whether tuberculous or not remain indifferent to the functional condition of the uterus. In forms in regression, or which have been long stationary, there may be a relighting up of the inflammation and an extension of the pelvic peritonitis. In suppurative cases, especially with salpingitis the lesions were made worse in general and the prognosis made poorer by the occurrence of pregnancy. There may be a rupture of pus into the abdominal cavity, diffuse peritonitis, and septicemia. This acute lighting up of the process may occur either during pregnancy or after it has ceased, and during the puerperal state. In general the condition becomes worse after abortion. The fatal cases were those that were relighted during the puerperal state. Tuberculous forms especially may continue in a stationary condition during pregnancy, and become worse after pregnancy is over. The elements which cause the condition to become worse are mechanical, circulatory, and biological. The lack of quiet for the organs, the changes of position, rupture of adhesions, and the effects on the inflammatory conditions of the enlargement of the uterus are all bad. The nutritive modifications in the tissues, consequent on pregnancy and the trauma of digital and instrumental examinations, also make

these cases worse. Pregnancy is generally interrupted spontaneously. In some tuberculous cases pregnancy may go on to term. The conditions of stasis, and changes due to adhesions have a bad effect on the uterus, and on the development of the ovum, which may become infected. The general maternal condition is not favorable to development of a perfect ovum. The treatment of these lesions should generally be expectant and antiphlogistic. Surgical operation should consist of aspiration of the pus in Douglas' culdesac. In cases of incomplete abortion the fetus must be removed and its membranes separated from the uterus. There should be no attempt at induction of abortion. As far as possible the two conditions must be let alone as long as the pregnancy exists; but when obstetrical complications occur operation must take place promptly. Colpotomy to remove purulent collections is allowable. Annexionectomy with conservation of the gravid uterus, or with Cesarean section may have to be done. We must know the nature, location, and extent of the lesions before operating in any way; and we must limit the field of infection as far as possible. If the case is slight, if there are elements that allow of a good prognosis, we should limit ourselves to a simple medical treatment with the hope of a lasting pregnancy. Operation must be reserved for those forms where the prognosis is entirely bad, and the only hope of life is in removal of the organs.

Undulating Fever in Its Relations to Pregnancy, Labor, and the Puerperal State.—Amédée Laffont (*Arch. mens. d'obst. et de gyn.*, April 20, 1915) has studied the relations of pregnancy, labor, and the puerperal state to Malta fever. This disease is caused by the *Micrococcus Militensis* in the blood of the patients, and is diagnosed by the use of the seroagglutination test of Wright. Although sufficient clinically this method of diagnosis is scientifically doubtful. Genital manifestations of the disease are not rare. They are ovarialgia, annexitis, dysmenorrhea, amenorrhea, menorrhagia, metrorrhagia, menstrual irregularities, and leukorrhea. The micrococcus is often seen in the vagina and contagion by sexual intercourse is probable and has been demonstrated. Mastitis has been observed. Abortion and premature labor are frequent during a rise of temperature. The micrococcus has been shown to pass through the placenta. When born at term the infants are weak and many of them die early. Pregnancy does not immunize the patient to the fever. It may begin at any period of the gestation which does not in any way modify the course of the fever. The fever may complicate labor by prolonging it or by causing hemorrhage. The symptoms of the fever may cause increase or diminution of those of labor without the possibility of giving the reasons for their increase or diminution. We may believe that septic infection has taken place in the puerperal state while the symptoms are simply due to the fever. The violence of the chills, the severe rise of temperature, perspiration, vomiting, sensibility and puffing of the abdomen, with the rapidity of the pulse simulate genital infection. Uterine involution and the lochia are usually normal. but there may be suppuration and there may be odor of the lochia. The milk is diminished and the micrococcus is seen in large numbers

in the milk, though it is seldom communicated to the fetus in this way, probably on account of a previously acquired immunity of intrauterine origin. Nursing should be prohibited for the benefit of the mother. The postpartum state favors the development of the fever if latent, and may aggravate or diminish its intensity. The micrococcus may cause suppurations, osteitis, periostitis, endocarditis, or phlebitis.

Separation of the Normally Situated Placenta with Eclampsia and Uteroplacental Apoplexy.—E. Zarate (*Ann. de gyn. et d'obstet.*, Aug., 1914; April, 1915) gives the histories of two cases in which there were puerperal convulsions complicated by separation of the normally inserted placenta. Examination of the uterus and placenta in one case showed that there was apoplexy of the placenta, which accounted for its premature separation. In one case bleeding never ceased and the patient died from hemorrhage in spite of skillful treatment to arrest it. In the other case a hysterectomy was done to stop the hemorrhage, but the patient succumbed after the operation. These are most serious cases and demand the greatest skill of the accoucheur.

GYNECOLOGY AND ABDOMINAL SURGERY

Uterine Hemorrhage at and after the Menopause.—Discussing this subject, F. A. Cleland (*Can. Med. Assoc. Jour.*, 1915, v, 389) says that the menopause is probably induced by retrogressive changes in the ovary. The menopause is subsidence of the flow of blood—an increase in the flow is always pathological. The menopause may occur during a period of thirty years or more, from twenty-six to fifty-six. A local examination should always be made where hemorrhage occurs near the menopause. Professional and public education regarding the early symptoms of cancer of the uterus is necessary. In severe cases of uterine hemorrhage which have resisted all medicinal treatment and where the patient is becoming progressively worse hysterectomy is indicated. There seems to be no connection between hyperplasia and hypertrophy of the endometrium and hemorrhage from the uterus. At or near the menopause the curet is of little service except for diagnostic purposes. No palliative measures should be tried till malignant disease is excluded. General conditions may be the cause of hemorrhage, and syphilis should not be overlooked. Organotherapy is of little value in hemorrhage at or after the menopause. Blood transfusion is a possibility in treatment of severe cases.

Echinococcal Invasion of the Ovary, Etc.—H. C. T. Young (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxvi, 207) records a case which he believes to be one of primary echinococcal invasion of the ovary although three hydatid cysts, each as large as a very big orange, were removed from their attachments to the omentum, and a larger hydatid, about the size of a football from beneath the left lobe of the liver. He also presents personal communications on other pelvic hydatids collected from various sources in Australia.

Diffuse Septic Peritonitis.—H. A. Bruce (*Can. Pract. and Rev.*, 1915, xl, 217) emphasizes the necessity for early operation in all cases of acute appendicitis; the importance of a rapidly performed operation, with as little manipulation of the intestines as possible; that the patient should be placed in the Fowler position as soon as the diagnosis is made, should remain in it until the operation is performed, and after it until danger is over; the necessity for a careful watch for mechanical obstruction, which should be relieved by immediate operation, and also for symptoms of other complications, such as subphrenic abscess.

Cancer of the Breast.—In reporting 100 cases of cancer of the breast, R. Howard (*Practitioner*, 1915, xciv, 742) emphasizes the late stage at which these cases are usually seen, chiefly due to the patient taking no notice of the lump because of the absence of pain. A patient not infrequently has noticed a lump for one or two years before seeking advice. The great difficulty or impossibility of diagnosing clinically between early carcinoma and a patch of chronic interstitial mastitis is noted, as is the difficulty in giving a prognosis in any particular case. Experience shows that recurrence of the growth after a skilful radical excision is mostly seen in the axillary region and in the neck, whereupon the vessels, particularly the veins and the nerves of the arm, become blocked and compressed. The neuralgic pains of the arm and the edema of the same are for the most part the evidences of such a recurrence. As a last resort in such cases, C. Beck (*Jour. A. M. A.*, 1915, lxiv, 1749) favors exarticulation of the whole shoulder-girdle, including clavicle, arm and scapula, with the plexus and the vessels of the affected side, with the ribs, if necessary, should they seem invaded by the carcinoma. In man individual case there must be an individual plan in order to make the operation safe. On the whole, the operation begins with the formation of a large skin flap destined to cover the whole area of the defect, the exarticulation of the clavicle following, then dissection of the tissues of the neck and axilla in one block, ligation of every vessel as it is reached, cautious cutting of one nerve after the other, and lastly, the separation and excision of the scapula. The writer has done this operation eight times. All cases were desperate. Some of the patients operated on several times were considered inoperable.

DEPARTMENT OF PEDIATRICS.

TRANSACTIONS OF THE AMERICAN PEDI- ATRIC SOCIETY.

*Twenty-seventh Annual Meeting, Held at Lakewood, N. J., May 24,
25, and 26, 1915.*

*The President, GEORGE N. ACKER, M. D., of Washington, in the
Chair.*

ADDRESS OF THE PRESIDENT.

DR. ACKER declared that there was to-day no question of greater moment before the public in general, and this Society in particular, than that of "Child Welfare." The importance of this subject had found national expression in the establishment of the Children's Bureau of the Department of Labor. This Bureau under the guidance of its Director had done creditable work, not the least interesting and important of which was that done at Johnstown, Pennsylvania. That the wage of the father was the key to the infant's chance to live, loomed up as the feature of the first report of the Children's Bureau in its study of infant mortality in the United States. The death rate among children was in inverse proportion to the earning capacity of their fathers. The infant death rate was five times as high in a poor, unsanitary section of city as in a better residential district. In families where the earnings of the father were less than \$10 per week, the infant mortality was 256 per 1000 babies, whereas in those where the earnings were in excess of \$25 the mortality was 84 per 1000. This report seemed to show the importance of breast feeding for at least three months, only 46.6 babies per 1000 dying under one year of age when breast fed for at least three months, as against 165 per 1000 when fed exclusively on artificial food up to the age of three months. The city was found to bear its share of responsibility in the infant mortality, a high death rate being coincident with neglected streets and unsanitary housing. Taking boarders in the home or work outside of the home on the part of the mothers also has a large influence in increasing the mortality of their infants.

The Children's Bureau was trying to find the conditions of life most favorable to the American baby. Every mother of a Johnstown baby was visited by a woman agent of the Bureau and information obtained concerning the environment of the baby. The

subjects considered in this report were city and street, environment, housing, mother's age, literacy, married history, manner of feeding the infant, occupation of the mother, the family earnings, etc. This most valuable report gave in a concrete way all that they had known before in a general way and pointed out how many infants could become strong and develop into useful members of society. Since the problem was an economic one it became the duty of the State to provide the necessities for healthful living if the parents were unable to do so. The lowered death rates in the slums of foreign cities had been the result of governmental aid in the construction of sanitary houses and the making of living conditions more favorable. The advantages of play grounds, school lunches provided in some cities, and the classes for teaching girl pupils the care of infants were all considered. Those escaping the ravishes of war, and the results of the hasty marriages encouraged by authorities, and the want of the necessities of life, would all show in an offspring mentally and physically weakened and the infant mortality would be correspondingly high. Our county could not be expected altogether to escape the influences of the war in this respect. With the increased demand for food stuffs and the soaring prices the children of the poor would be deprived of the requisites for normal nutrition. That much could be done to lessen this evil had been shown by Professor A. Pinard. He stated that the infant mortality in Paris was 21 per cent. less during the first six months of the war as compared with the same period of the preceding year, and that maternal mortality also decreased proportionately during the same period. He attributed these results to the measures taken by the maternal and infant aid society organized at the beginning of the war. Dr. Acker called attention to the danger of contact infection with tuberculosis during child life as having been too much neglected and also to the mistake of placing too much emphasis on the destruction of infectious material at the expense of building up of individual resistance by good food and proper hygiene. Health officers should have ample authority to remove infants from an environment which was dangerous to more sanitary surroundings. That the infant constantly exposed to tuberculous infection from its parents or other members of the family was just as much entitled to protection as authority would promptly give it were the diseases smallpox or diphtheria seemed to the writer perfectly rational, surely the danger was almost as great. Dr. Acker lamented the chaotic condition of their principles of infant feeding which left the student when he had completed his course at a medical college confused as to the most important subject in the whole realm of pediatrics. He felt quite convinced that by a united effort a reform could be brought about.

In closing, Dr. Acker considered the needs of the Society, and while congratulating them for the high standard that they had maintained suggested that their membership could be enlarged with advantage to the many other men in their special line of work and also to themselves. He suggested that they might provide an associate membership

from which men could be advanced to full standing upon a basis of merit. He expressed the fear that they might be turning rather too exclusively to the laboratory side of medicine, with a consequent neglect of the clinical work, and felt that they should preserve a proper balance, their membership being made up both of clinicians and of laboratory men. There were many men lending great efforts to the advance of pediatrics but in a clinical way, and he felt that they were in a splendid position to verify the work of those who by inclination and opportunity were engaged in original search.

CUBIC AIR SPACE FOR INSTITUTIONAL BOTTLE-FED INFANTS.

DR. THOMAS SOUTHWORTH, New York, said that in New York State the law prescribed a minimum of 600 cubic feet of air space per inmate in institutions for children, and that while ventilation was a nominal requirement, such ventilation was neither defined nor enforced. There was no apparent evidence that the laws and rules were based on competent pediatric authority, but rather that they had come about through custom and compromise. In the hope of securing some definite data of value and authority, a questionnaire was sent by the writer to each member of this society, the inquiry being restricted as far as possible to bottle-fed infants under one year of age, unaccompanied by their mothers, since these infants constituted the most vulnerable group among whom there was admittedly the largest mortality. After stating the question that had been asked and analyzing the answers received, Dr. Southworth concluded as follows:

1. The majority of the hospitals and institutional wards for infants from which reports of cubic air space were received provided 1000 cubic air space and upward for each inmate, and only five reported 600 cubic feet or less.

2. Even with 1000 cubic feet of air space free ventilation was deemed highly important, and as the space decreased such free ventilation became more and more imperative.

No allowance of cubic air space was at present made for the necessary attendants in the wards.

4. Reduced cubic air space meant less square feet of floor space and less separation between cribs, with proportionately increased opportunity for the spread of cross infections. There was a growing belief that even with free ventilation separation of the beds played as important a rôle as cubic space. Such adequate separation, however, was only attainable with large cubic air space.

5. On account of their handicaps, bottle-fed babies were more liable to require more space than nursing infants.

6. Bottle-fed infants required as much cubic space as so-called sick or "medical or surgical" cases among infants.

7. The majority of pediatric physicians believed that infants should have as much cubic air space as adults, if not more, and that was especially true of bottle-fed infants because they were more susceptible to infection, suffered in their nutrition in confinement, and notoriously do badly in all save the best-equipped institutions.

8. Bottle-fed infants when retained for any considerable length of time in hospitals or institutions, cannot properly be classed as well infants because a considerable proportion of them suffer both in their digestion and nutrition, as well as from intercurrent affections, and therefore require unusual attention in their feeding and general care.

9. Limited cubic air space, involving limited floor space, is an important contributory factor in the high mortality of artificially fed infants, and such crowding in limited space was very commonly the concomitant if not itself the cause of faulty hygiene, insufficient care and inadequate nursing.

10. Even with a liberal allowance of cubic air space, free and abundant ventilation was of equal importance. In addition, provision for roof-gardens, porches, and sunparlors was advisable, if not imperative.

11. The mere presence of windows does not of itself constitute ventilation, but their proper use must be provided for.

12. A low minimum of cubic air space established by law, without definition of what constitutes efficient ventilation and without enforcement, may be more harmful than beneficial, and may constitute a virtual license to overcrowd in ill-ventilated wards.

13. The example of the more progressive hospitals and institutions which provide the larger amounts of air space per infant, together with free ventilation, was to a considerable extent nullified by state and local regulations, licensing for the less progressive, the employment of minimum air space (contrary to the majority opinion of those best qualified from experience to judge) for a class of infants among whom there was admittedly an unduly high death rate.

DISCUSSION.

DR. L. EMMETT HOLT, New York, said that Dr. Southworth had done a service in formulating and putting in a concrete way the needs for study along this line. The problem was a difficult one for pediatricists since so much depended on the cooperation of hospital authorities. It was a question in New York whether children having hospital care did better in separate institutions or in a special department of a general hospital. He thought children were better off in a special institution in some ways, since they required a special kind of care and in institutions for the housing of children a special construction was desirable. However, there were some advantages in a large general hospital, among which were training schools for nurses, opportunities for consultation with physicians in other special departments of the hospital and opportunities for the training of internes that would give them experience in dealing with children's diseases. The problem was, which, on the whole, the general hospital or the special institution for children, offered the greatest advantages for the child. Dr. Southworth had put in a general way the requirements essential for children in institutions as regarded cubic air space. Children needed from two to three times as many nurses as would be required for the same number of adults.

DR. ROLAND G. FREEMAN, New York, said that in the matter of cubic air space what the child needed was free-moving air from open windows. Outdoors was better than in. Even with open windows the circulation of air inside the wards was dependent on the amount of wind or circulation outside. As to the comparison between the general hospital and children's hospital, he felt that he could speak as he had been connected with both. The disadvantage of the childrens' hospitals were that they had nearly all grown from nurseries and foundling homes and one did not get the advantage of studying the variety of cases that one had in a general hospital, nor the advantage of contact with men in other departments by which they might become familiar with methods that were being employed with adults that might be applied to children as well.

DR. L. E. LAFETRA, New York, said there were many other factors besides the cubic air space that had to do with the welfare of infants in institutions. In Bellevue Hospital the cubic air space per infant varied; it was not less than 700 cubic feet in any instance and in one ward there was as much as 1500 cubic feet per infant. The fewer babies there were the better they did, and that brought up another point, namely, that with the same air space the breast-fed infants did better than those artificially fed. Another factor that entered into the matter was that when more babies were admitted to a ward more nurses were not added, and the amount of individual care and mothering the babies received had a very important bearing on their welfare. Still other factors that might be mentioned were the need of sunparlors, balconies, roof-gardens, etc., and the fact that there was frequently inadequate nursing at night. It should also be emphasized that beds should be far enough apart not to be within striking distance of cross infection.

DR. S. MCC. HAMILL, Philadelphia, said that with reference to the question that Dr. Holt brought up a great deal depended on the hospital authorities and management as to what kind of accommodations could be secured. The special institution for children seemed to be the more valuable method at the present time, though if the hospital authorities provided proper conditions and sufficient wards to care properly for the children, they would do as well in a general hospital. At Johns Hopkins they had a children's department which was practically a part of the general hospital, that is, it was administered as a part of the general hospital. The question really resolved itself into one of hospital administration.

DR. HENRY L. COIT, of Newark, said that the point that was interesting to him was that artificially fed infants needed as much cubic air space as adults and this must be due to the fact that the atrophic infants radiated heat rapidly. With this type of infants he had to be more careful as to the ingress and egress of air, and the air should be warmer than for normal healthy infants. Many institutions were not properly equipped for ventilation and had to depend on windows. With these atrophic infants radiating heat rapidly a proper balance could not be obtained by window ventilation. They had tried to get 1000 cubic feet of air space per infant. In

determining air space some allowance must be made for the physical condition of the child and its capacity for maintaining heat.

DR. FRITZ B. TALBOT, Boston, said he took exception to one thing Dr. Coit said in reference to atrophic infants. In comparing the heat radiation of atrophic and normal children they had found that in atrophic infants the subnormal temperature was not due to radiation from the skin but to the fact that the engine did not make enough heat to keep up the temperature and heat had to be supplied from the outside.

DR. SAMUEL S. ADAMS, Washington, said that securing proper ventilation depended on a great many things. A competent architect was one of the essentials. Another point was that if one could not get requisite in the way of proper hospital construction from the managers it was sometimes possible to do so by appealing to the ladies board. He related an instance in which he had been successful by resorting to this method. In speaking of exercise for sick babies in hospitals, the speaker said it was impossible if one gave from eight to twelve babies to one nurse to expect her to have time to carry the babies about and give them the exercise they should have. He had secured the adoption of a plan of having the mothers come and take the babies out in the afternoon and also in having nurse maids employed for this purpose. The babies that had this exercise undoubtedly did better than those that did not. They should, insist that children in hospitals should have an equal chance with adults.

DR. SOUTHWORTH said that he agreed with the speakers who thought that the welfare of the children was not so much a question of cubic air space as of other things. But by getting sufficient air space they could get regulations that would prevent overcrowding. A great many of the answers that came in indicated that windows were opened where there were marasmatic children. During a great part of the winter the windows could not be kept open and these marasmatic babies be kept warm. There was a growing belief that babies should not be kept in foundling hospitals, but were better off if boarded out. It was noticeable that in the two states New York and California that were making the greatest effort to board out babies, the laws required the least cubic air space in institutions for infants.

PARAPHARYNGEAL ABSCESS AS DISTINGUISHED FROM RETROPHARYNGEAL AND PERITONSILLAR ABSCESS.

DR. HENRY HEIMAN, New York, said that while ordinarily retropharyngeal abscess was easy to diagnose there was a class of cases in which incision yielded little or no pus, the symptoms of fever and pain on swallowing continued, the patient became more septic in appearance, and the tumefaction within the oral cavity remained the same, while the external swelling usually increased in size. The signs might continue unabated or might become progressively worse, even after repeated, usually unsuccessful, incisions from

within the mouth, until a deep external operation was done, when as a rule considerable pus was evacuated and the patient recovered. It was with the view of classifying these cases and clarifying this phase of the subject that this paper had been written. The essayist stated that it would be readily understood from an anatomical point of view how any inflammation of the rhinopharyngeal mucous membrane might be followed by a parapharyngeal as well as a retropharyngeal abscess. Although the etiology of both conditions was practically the same, it was their observation that the retropharyngeal type was most likely to occur after the ordinary rhinopharyngitis, while the parapharyngeal type usually followed influenza, tonsillitis, scarlet fever, measles, and other infectious diseases. Retropharyngeal abscesses occurred nearly always in infancy as the retropharyngeal nodes were supposed to atrophy after the third year of life. The parapharyngeal abscesses involving, as they did, the lateral lymph chains of the pharynx were more common after the age of three, and probably occurred more frequently than was supposed, owing to the fact that they might be mistaken for the ordinary retropharyngeal variety. The so-called parapharyngeal abscess was differentiated from the retropharyngeal abscess by the fact that its site was by the side of or lateral to the pharynx, while the retropharyngeal abscess, though it might produce a central bulging, was usually somewhat lateral to the midline; it did not displace the tonsil and was, as a rule, accompanied by edema of the pharynx and uvula, a brassy voice with symptoms of more or less laryngeal stenosis and at times by a retraction of the head. On palpation a distinct cushion-like feeling or fluctuation might be obtained. The parapharyngeal abscess produced bulging near the lateral wall, if at all, internally, but rarely in the midline; it nearly always displaced the tonsil, and this was an important point, toward the median line, and was rarely accompanied by any marked local change in the appearance of the pharynx or by any symptoms of pressure on the larynx. In the case of retropharyngeal abscess internal incision usually cured unless the suppuration extended to the lateral columns of the pharynx, at which stage the retropharyngeal abscess became a parapharyngeal abscess and then required an external incision, or burrowed its way into the mediastinum. The retropharyngeal abscess was usually diagnosed early, while the parapharyngeal abscess might progress for one or two weeks before a diagnosis was made, or before the external swelling became sufficient to warrant an external incision. Of importance also was the age of the patient; an abscess in a child over three years of age being more likely to be of the parapharyngeal type. Parapharyngeal abscess was distinguished from peritonsillar abscess, from the fact that in peritonsillar abscess there was a marked redness of the soft palate and a swelling above and to the inner side of the tonsil pushing forward the anterior pillar of the fauces. This abscess pointed within a few days and ruptured spontaneously or required incision. The tonsil was not usually displaced inward as in the parapharyngeal type; the course was not a matter of weeks and

there was no external swelling. Parapharyngeal abscess was differentiated from interstitial or tonsillar abscess in that tonsillar abscess might follow a severe tonsillitis, involve the tonsils alone and, as a rule, did not push the tonsil toward the midline. They caused a marked tumefaction of the tonsil itself but never an external fluctuating mass. From cervical adenitis occurring in the course of the infectious diseases parapharyngeal abscess was distinguished by the fact that in cervical adenitis the superficial glands of the neck were involved and the process rarely spread to the deeper lymphatic structures. There was, as a rule, no suppuration and consequently slight prostration and lastly, there was never any pushing inward of the tonsil. In the treatment of parapharyngeal abscess repeated internal incisions frequently failed to cure and an external operation with drainage was, in the opinion of the speaker, the ideal method.

DR. HEIMANN summarized as follows: 1. There occurs especially in children a form of abscess, which is occasionally mistaken for a retropharyngeal abscess but which has a separate and distinct entity. It may be called parapharyngeal abscess as its site is in the lateral columns, that is by the side of the pharynx. 2. The origin of the abscess is from the superior chain of deep cervical glands which are situated along the course of the carotid artery, as distinguished from retropharyngeal glands, situated in the circumscribed retropharyngeal space, just lateral to the midline and in front of the prevertebral muscles. 3. These abscesses were as a rule cured only by external operation.

DISCUSSION.

DR. WILDER TILESTON, New Haven, Conn., had just seen a case of parapharyngeal abscess which presented in the pharynx in which the abscess perforated internally, contrary to the rule Dr. Heiman had laid down, and without external incision.

DR. THOMAS S. SOUTHWORTH said peritonsillar and parapharyngeal abscess were likely to be confused, but as Dr. Heiman had said in peritonsillar abscess there was more swelling about the tonsil but not an external fluctuating mass. In these two groups there were border-line cases, but it was interesting to note the vague swelling without any particular outline in peritonsillar abscess before one could feel the glands and state that an abscess was there. The abscesses grouped under these two heads sometimes pointed inside and sometimes outside. He had seen a parapharyngeal abscess come just inside under the mucous membrane of the pharynx. Dr. Southworth said he wished Dr. Heiman would state whether these parapharyngeal abscesses pointed externally or whether one has to go down after them as after those secondary to scarlet fever.

DR. L. E. LAFETRA, New York, would like to add his testimony to what had been said in reference to the swelling in peritonsillar abscess and also to say that parapharyngeal abscesses could certainly be opened from within if the cases were such as he understood

were included in the parapharyngeal group. Many cases which were not peritonsillar and not retropharyngeal and in which there was a large amount of swelling on the outside and the pharynx pushed the tonsil in toward the midline, could be better opened from within. Another point was that in these cases in which there was a large amount of swelling and the tonsil was pushed in one need not be in too great a hurry to operate, since if expectant treatment was employed, hot irrigations, etc., the abscess might open of itself.

DR. WALTER LESTER CARR, New York, expressed the opinion that it would sometimes be found difficult to make distinctions according to this classification. He recalled a meeting where this subject was discussed and the surgeons were all in favor of an external operation while the medical men thought these abscesses could be reached internally or could be brought to a point by irrigations. The paper had not told them definitely when a case was suitable for a surgeon and when it was proper to use a small incision, an operation such as could be done by any of them. But, of course, the operation that would give the best drainage, whatever the form of infection, was the preferable one.

DR. J. P. CROZER GRIFFITH, Philadelphia, said he would like to ask the members if their experience was the same as his had been with these abscesses. Dr. Heiman had said that the diagnosis of retropharyngeal abscess was easy, but from the experiences which he had had in consultation with general practitioners, he had been led to believe that it was not so very easy. In one case the physician who called him in said he had never seen a retropharyngeal abscess. He also related an early experience with a case in which he made a diagnosis of abscess in the pharynx and asked a surgeon to operate. The surgeon was skeptical as to the presence of an abscess but was finally induced to operate, and, on making the incision found the abscess there as Dr. Griffith had prophesied.

DR. HEIMAN, in closing the discussion, said that in reference to Dr. Tileston's question, he had stated that these parapharyngeal abscesses did sometimes rupture spontaneously; he had mentioned one case of that kind. Both the superior lymph chain and the deep cervical glands might become infected and the patient might recover without operation. In his conclusions he had left a loophole by saying "*as a rule*, these abscesses were cured only by operation." With reference to Dr. Southworth's remarks, he had said in the paper that the parapharyngeal type of abscess usually followed tonsillitis, scarlet fever and other infectious diseases. Again the parapharyngeal abscess was much slower in developing, while the peritonsillar abscess developed in from twenty-four to forty-eight hours and involved Rosenmüller's fossa. With reference to Dr. Porter's question as to the involvement of the superficial glands at the angle of the neck—in the paper he had said that in cervical adenitis the superficial lymph glands of the neck were involved but the abscess pointed out and the tonsil was not deflected toward the median line.

A CONTRIBUTION TO DUCTLESS GLAND THERAPY.

DR. ROYAL STORRS HAYNES, New York, related the history of an abnormal child whose case was of particular interest in demonstrating the particular activities of the pars intermedia of the pituitary gland. This patient was brought to the Dispensary of the Babies' Hospital, September 1, 1905, at the age of three years and eight months, at which time a diagnosis of cretinism was made. The child was put on thyroid in small doses. She gained rapidly and steadily in weight and height and intelligence. At the end of two years she was bright and intelligent with a closed fontanelle and a not greatly protuberant abdomen. Enuresis was noted at the end of this period. Shortly after this it was observed that she was not as bright and the dose of thyroid was increased. At the age of eight years she came directly under the charge of an assistant of Dr. Haynes who thought she needed more thyroid and increased the dose accordingly. She had at least 10 grains a day during the entire year of 1912. This increase of thyroid was not productive of mental improvement and did result in a loss in weight. The patient became nervous, irritable, of a poor mentality, and wet the bed every night. In 1913 she came under the direct care of the essayist, at which time she was a large child, though below the average weight. She had an excessive appetite and was excessively nervous. It was apparent that she was suffering from too much thyroid. The drug was omitted for a time with advantage to the patient. However, her color became grayish and the thyroid was again administered but its withdrawal was soon indicated. She received no thyroid during the spring and summer of 1913, during which time she improved greatly both mentally and physically. She seemed remarkably normal in every way except that she showed some of her cretinism in her shortness, her lordosis, and her prominent abdomen. In September she had an attack of poor appetite and grayness which disappeared under treatment with rhubarb and soda, without thyroid. Another attempt to give thyroid drew the attention of the essayist to the necessity of having absolutely fresh gland and immediate desiccation. During the past six months it seemed that some other agency was at work or released by the withdrawal of the thyroid, because the patient's weight increased so rapidly and her general bigness, although her height had not. Her face was heavy, her fingers blunt, and she looked old and sullen. The possibility of pituitary gland involvement suggested itself and a radiograph seemed to show that the sella turcica was enlarged. By mistake, when they tested her tolerance for glucose, she received 250 grams instead of 150. Yet she retained it. Acting on the suggestion that an enlarged sella meant an enlarged pituitary, while the increased tolerance for glucose meant a deficient pars intermedia, they concluded that there was a hyperplasia of the pars anterior causing enlargement of the face, hands and feet, and that this by pressure on the pars intermedia or its blood supply caused it to become

deficient. Acting on this a preparation of *pars intermedia* was obtained in capsule form, each capsule being equivalent to 150 pounds of live bullock. After taking the capsules for two weeks it was noted that her expression was brighter, as though something had been lifted from her countenance; her mouth was more closely shut; there was an increased smoothness of the skin and it was considerably thinned. In a month her face had lost its vacant stare and her skin was improved. The capsules were continued and by the following July there was a distinct change in her facial expression and her skin. Her fingers which had been blunt had become tapering; her hips were slender and shapely, and her lower extremities were straighter. The skin was soft and the hair oily. Secondary sexual development was taking place. This was not directly attributed to the therapy but to the effect of disturbance of that gland upon the interstitial cells of the ovary. An attempt was made at one time to resume thyroid but it had to be abandoned. The pituitary had been omitted and then resumed at different times up to the present. The patient did not now appear to be an abnormal child, only a rather heavy, stocky one, very good natured, and not sensitive to pain. Serial photographs showed her progress. It seemed evident in this case that assuming the deficiency of thyroid as evidenced by her condition when she first came under treatment, that there was also an affection of the pituitary, which partook of the nature of a deficiency of the *pars intermedia*.

As to whether the pituitary had always been at fault, or whether the overdosing of thyroid had affected it or the withdrawal of thyroid had allowed it to assume an activity, were subjects of speculation. However, the *pars intermedia* therapy seemed to be productive of a striking change.

DISCUSSION.

DR. CHARLES HERRMAN, New York, said that this case bore out his contention that frequently more than one gland was affected, that there was a correlation between the so-called ductless glands. Assuming this to be the case an extract composed of thymus, suprarenal and pituitary was better than thyroid alone. As to cretinism, it was infrequent to see such a marked disturbance or such an acromegaly as was exhibited by the case which Dr. Haynes had just reported. As to the treatment of cretinism itself they had formerly used only thyroid extract but they were now using thyroid protein and the results were as good if not better than with the thyroid extract formerly used.

DR. GRIFFITH, Philadelphia, said he had under his observation a boy who was somewhat of a puzzle to him in view of their lack of knowledge of internal secretions. This boy had a gigantism and both a hypo- and a hyperactivity of some ductless gland. He did not see how this could be unless there was something besides the pituitary diseased.

DR. HAYNES replied that there might be an association of thyroid and pituitary disease. There was a basis for this belief since removal of the thyroid had been shown experimentally to result in hyperplasia of the pituitary.

THE ENERGY METABOLISM OF AN INFANT WITH CONGENITAL ABSENCE OF THE CEREBRAL HEMISPHERES.

DR. FRITZ B. TALBOT, Boston, stated that this baby entered the Massachusetts General Hospital Oct. 24, 1913, when eight months of age. Two months before the mother had noticed that he was unable to sit up, hold his head up, or do as other babies of the same age did. He was said to be very quiet, gained weight rapidly and had always been breast fed. The physical examination showed a large baby with a thick layer of subcutaneous fat. The muscles were felt with difficulty and seemed to be relatively undeveloped. His head rolled about constantly when he was held up. The anterior fontanelle was slightly depressed, the posterior was closed. He was blind, the pupils were equal, of moderate size and did not react to light. Examination of the fundus showed optic atrophy with considerable cupping of the discs. He had an idiotic expression. The knee-jerks were equal and lively; there was no Kernig's and no Babinski's sign or paralysis other than the muscles of the neck. The baby remained absolutely quiet most of the time and did not seem to notice anything. His actions gave the impression that he was deaf. The slightest touch on any part of his body results in crying at times resembling laryngismus stridulus. The reaction to touch seemed more highly developed than in the normal infant. An operation for the relief of the blindness showed that the hemispheres of the brain were entirely absent and replaced by cerebrospinal fluid. At the base of the skull there were a series of nubs, none larger than a small walnut, the posterior of which probably represented the cerebellum; the optic nerve was recognized. About 8 ounces of spinal fluid was removed and replaced with normal salt solution. The pulse rate when the child was at rest was 69 to 70 per minute, during muscular exercise 120 to 140 per minute. He weighed 330 grams more than the average baby of the same age. The metabolism was determined in the apparatus described by Benedict and Talbot in "Gaseous Metabolism of Infants" (Carnegie Institution of Washington, Pub. 210). Charts were presented in which the metabolism of this child was compared with that of two normal infants of about the same age, weight and length. The metabolism of this child was extremely low by the comparison with the two normal infants. Although periods of minimum muscular activity were sought for, the data showed that no period had a relative activity less than two and the values were determined with some visible recordable activity as shown in the graphic records, while the values recorded for normal infants in this comparison had much less activity. This accentuated even more the extraordinarily low values for this

child since the increased activity would obviously result in a somewhat higher heat production than he would have had had he remained absolutely quiet. His minimum metabolism was relatively lower than that of a new-born babe and of several fat infants none of which produced less than 42 calories per kilo of body weight. Since this child was deprived of volitional areas of the brain, his life was similar to that of the frog in which the cerebral hemispheres had been removed. He therefore did not develop musculature as would a normal infant, and as a result his body was made up principally of fat and bones with a small amount of muscle. His temperature remained constant during the time of observation. The vital functions of this infant were carried on at a very low plane because his existence was purely reflex. Unless some external stimulus caused him to move there was little or no muscular activity and as a result only a small amount of fuel was necessary to keep the furnace going.

DR. JOHN HOWLAND, Baltimore, said he had, in his metabolism studies, reported a case somewhat comparable to this. His child was eight years old when first seen and weighed only 13 pounds. His condition was the result of spinal meningitis. His metabolism was very low as he had almost no muscles with which to make heat and his weight was almost entirely in the parenchymatous organs and in the skeleton. The results of the metabolism observations were nearly comparable to these presented by Dr. Talbot.

DR. TILESTON was interested in the clinical aspect of this case and would like to know whether there were any epileptiform seizures, chronic spasticity, tachycardia and increased respiration.

DR. TALBOT replied that there were no changes in the respiration and no nervous symptoms, except that when the child cried he made a sound suggestive of laryngismus stridulus.

DR. TALBOT said he had one other unreported case of lethargic cretinism. He had put the child in the baby box and his metabolism was almost as low as that of the case just reported.

ALLERGY TO COMMON FOODS.

DR. OSCAR M. SCHLOSS, New York, reported his observations derived from a study of forty-three cases of food idiosyncrasy. Among these there were cases of idiosyncrasy to milk, egg, beef, horse protein, wheat, rice and other cereals and food stuffs. It was unusual to find the idiosyncrasy confined to a single food substance, but, as a rule, it was confined to several of those enumerated. Among the most frequent symptoms due to food idiosyncrasy were urticaria and angioneurotic edema. In some of the several types of food idiosyncrasy these symptoms followed immediately after the ingestion of the toxic food, affecting the lips and buccal and pharyngeal mucous membranes. The more remote form might follow within one-half to three hours after the food was ingested and might involve the entire body. The relationship of eczema to food allergy was of great interest. During the past two

and one-half years Dr. Schloss had observed eighteen cases of pronounced eczema and in every case a cutaneous reaction was caused by the proteins of one or several foods. In many instances the withdrawal of the food to which the most striking disturbances were due was not followed by a disappearance of the eczema, but since the cutaneous reaction was practically always manifested toward several foods it was quite possible that the eczema might be due to some unsuspected food substance. That the relationship of the foods to the eczema might be causative was attested by the therapeutic results demonstrated in the cases reported.

A second group of toxic disturbances consisted of asthma or asthmatic bronchitis. Cases of asthma provoked by the ingestion of egg were not uncommon, and while asthma might be due to the ingestion of other foods the relationship was far from constant and in a number of cases in which such a relationship was suspected investigation gave only negative results.

A third group of symptoms were gastroenteric in origin, vomiting, pain and diarrhea, and were probably due to the direct irritant action exerted by the foods.

In a fourth group the food idiosyncrasy was indicated by the blood reaction which consisted of eosinophilia. In a number of cases of food idiosyncrasy the essayist had observed a marked increase in the eosinophile cells at the time of or directly following toxic food disturbances. The charts presented demonstrated the regularity with which this phenomenon occurred.

With reference to the cutaneous reaction, Dr. Schloss stated that in the more pronounced cases simple massage of the food or protein into the skin caused the appearance of crops of urticarial wheals. Inoculation of the food or protein into a skin abrasion caused the appearance of an urticarial wheal surrounded by a zone of erythema. The reaction was characteristic and so far as had been determined occurred only in cases of food allergy. Unfortunately, a cutaneous reaction was not always present, but in some cases an intracutaneous injection would provoke a reaction although the cutaneous test was negative. An observation of interest was the fact that the cutaneous reaction would often disappear during and directly following toxic food disturbances. It was also to be noted that in some instances equivocal skin reactions occurred so that the dividing line between negative and positive became very fine. Such instances were few, however, and further study might eliminate them. In all cases in which the essayist had made complete tests he had found that the offending food constituent was the protein. Numerous observations on anaphylactic shock had shown that when an animal recovered from the intoxicating dose of protein it then became immune to further injections. This immunity, however, was only temporary and within one to three months the animal again became sensitive to the protein to which it had been treated. In human beings it had been noted that patients once immunized to egg did not remain immune unless egg in comparatively large amounts was administered continuously. In six patients the immunity seemed to

be lost in from three to six weeks, when the further ingestion of egg protein in gradually increasing amounts again produced immunity. On two patients definite experiments in relation to antianaphylaxis were conducted. In both urticaria following the ingestion of egg appeared within one to three hours. Following this the reaction to egg protein became negative, but only to become positive later on. These observations served to show how anaphylactic disturbances might be cyclic even though the food causing the disturbance was ingested continuously.

In some instances the food idiosyncrasy was inherited while in others it was acquired.

The diagnosis of food allergy was made either clinically or by the cutaneous reaction, and the treatment must vary according to the type of the idiosyncrasy. The ideal method was that of desensitization by the administration of gradually increasing amounts of the toxic protein. The second method was that of eliminating the offending articles from the diet. Often the two methods might be combined with advantage. After speaking of the difficulties of treating eczema and asthma of allergic origin, Dr. Schloss concluded that the recognition of food allergy as the cause of these conditions enabled one to arrive at a rational treatment. At present his own experience did not warrant the assertion that a satisfactory result could be obtained in all cases in which it was reasonable to suppose that the disease was of food origin. It seemed probable, however, that this was due to the lack of satisfactory substitute foods and to the difficulties in obtaining a distinct cutaneous reaction in all cases.

REPORT OF CASES OF VARIOUS TYPES OF IDIOSYNCRASY TO MILK.

DR. E. W. SAUNDERS and DR. T. WISTAR WHITE, of St. Louis, gave the clinical history of twelve cases of infants showing idiosyncrasy to milk and apologized for presenting such a mass of clinical material without the accompanying laboratory work. Those cases characterized by vertigo on the administration of the least amount of dried milk put into the bread must certainly be classified as idiosyncrasy to milk. The most serious cases were the exclusively breast-fed infants with a family history pointing to this idiosyncrasy. These often proved fatal in a first attack and thus eluded the diagnosis based on cyclic vomiting; moreover vomiting might be almost absent from the syndrome. Idiosyncrasy to milk might be shown during the early months of life or might be developed at a later period. It might continue through life or it might cease. It might be partial depending upon the amount and the form of administration. If a baby did well on an ordinary feeding problem for a time and then reacted disastrously toward the whole, or toward a certain constituent, it might fairly be termed an idiosyncrasy especially if this peculiarity could be traced through subsequent childhood. In conclusion, the writers urged individualization in the dietetic treatment of infants and in critical cases of deleterious effects from milk, the recourse to cereal foods in spite of the fear of chronic dystrophies ensuing.

DISCUSSION.

DR. JOHN HOWLAND stated that during the last few months Dr. Blackfan had investigated twenty-three cases of eczema. Almost all of them were sensitive to one or more proteins; almost all were sensitized to egg, many to milk and two or three to cereals. Dr. Blackfan's experience was like that of Dr. Schloss. It had been impossible to produce passive immunity and tests showed no specimens from the blood. These children responded rapidly to treatment but there was usually a return of the symptoms. Among the older children there were one or two entirely cured. Therapeutically a small number could be definitely helped while a large number could not be improved in any way.

DR. FRITZ B. TALBOT had been following Dr. Schloss' work ever since he read his paper on this subject in New York three years ago and had been making observations of his own. His results had been the same as those of Dr. Schloss. The longest time a patient remained absolutely cured was three years; several children had lost the skin reaction. He had seen a large number of cases of asthma recently and about 60 per cent. gave a positive skin test to some food. He had found that egg was most commonly the offending article, and with egg allergy there was sometimes a positive reaction to nuts and of these especially to English walnuts. In several instances he had made the tests with different kinds of nuts; more frequently the peanut was the one that did not produce a reaction when the others did. Many that reacted to egg were also sensitive to horse serum. There were several who reacted to nuts, beef juice or milk but were negative to egg. He had had the same experience that Dr. Schloss had had that those that reacted positively to hen's egg also reacted positively to duck's and turkey's egg. In a majority of the cases there was a definite history of intolerance either in the father or the mother or both. When they had been able to immunize a child to a definite protein, the resulting effect on the eczema was striking. But in many children it was difficult to work up a tolerance to a certain protein. In one child he worked up to 10 milligrams, but every time he went higher he brought on an attack of asthma which put the child back for a week. When he got above 75 milligrams there was a definite improvement in the condition of the child and there was a diminution of the duration and severity of the attacks.

DR. JOHN LOVETT MORSE, Boston, asked Dr. Schloss if he thought every case of eczema and urticaria was due to food allergy.

DR. TILESTON, New Haven, said that Dr. Schloss' work promised to throw a flood of light on many skin diseases of obscure origin; some had already been shown to be due to anaphylaxis. Aphthous stomatitis and the visceral complications of erythema might be shown to have anaphylaxis as a basis.

DR. HAMILL said they were attacking this problem in a slightly different way. They were taking children in a condition of moderate ill health, having manifestations chiefly referable to the gastrointestinal tract, and trying a number of proteids by the puncture test.

They used the protein of egg albumen, cow's milk, beef, mutton, fish, etc., to determine for which one an intolerance existed. At present he had a case of asthma which reacted to all of the proteins thus far tried, but most strikingly to egg albumen. The child had been having attacks of asthma each day; when the egg white was stopped these ceased for ten days and then recurred. By the application of other tests they found that the child reacted to milk and that was removed from his diet. The attacks of asthma, however, had not stopped entirely. By working back from the history of the case and testing the child's reaction to different proteins one might find some reason for the condition of ill health.

DR. HAYNES had seen several of these cases of food allergy. In one of these cases there was an intolerance for chicken above a limited amount. Whenever that limit was transgressed one of two things happened, either there was a return of the eczema with a slight indiscretion, or the child would develop a night cough when it did not get an attack of asthma.

DR. HENRY HEIMAN would like to know whether this intolerance to egg existed for all egg or for a certain type of egg, and how Dr. Schloss applied the cutaneous test.

DR. FREEMAN said that many children who were thought to have an idiosyncrasy to milk were taken off milk and kept off this diet permanently and were thus injured by not having a well-balanced food. He had found it possible, acting on the suggestion of Dr. Schloss, to obtain tolerance to milk in such children by giving a very little at first and increasing the amount as the tolerance increased. Such children could often eventually take a normal amount of milk.

DR. GRIFFITH asked if possibly other food constituents might have the same effect as protein, since in some instances a large amount of carbohydrate in the form of sugar had appeared to bear an etiological relation to eczema.

DR. ISAAC ABT, Chicago, said that while some foods were badly taken care of by the system and gave toxic symptoms this was not a question of the food but of some peculiarity in the child and they now had no means of classifying or designating such peculiarities.

DR. I. OSCAR SCHLOSS, in closing the discussion, emphasized the point that it was only in severe cases of food allergy that he had been successful in producing passive sensitization. The permanence of the cure in eczema depended on obtaining immunity, and in instances of recurrence one sometimes found a child sensitized to a protein that he did not know of before. As to Dr. Morse's question, he was not in a position to answer it satisfactorily. Eczema in some instances was considered as due to intolerance to fat and sugar and such patients recovered by eliminating these articles from the diet. Of twenty-three cases of eczema, sixteen gave a positive reaction to some kind of food. As to asthma, he would not say that it was always due to food allergy; asthma was a disease of multiple etiology and might have other origins, and in only a small percentage of cases did one get a definite indication of a food origin. At the time he

had made his first report on this subject, Dr. Schloss said he had tested seventy-five or eighty institutional children as controls and got no reaction. Dr. Talbot had also found that he got only two reactions out of 100 tests and one of those was an infant with eczema. In two of Dr. Haynes' cases of idiosyncrasy for egg, Dr. Schloss had tested the children with different types of eggs and found that they reacted to other types of egg as well as to hen's egg. As to the method of using the proteid to make the skin test, they extracted the proteids from different foods and used them pure or in solution. Dr. Schloss described this process. The reaction took place almost immediately and lasted only a short time. With reference to Dr. Porter's question, as to the origin of the sensitization and whether it was possible to produce it through the intestinal tract, they had ingested certain foods in animals for a period of time and found that when they had ingested a certain quantity sensitization would be produced so it seemed that sensitization could be brought about through the intestinal tract. As to urticaria, Dr. Schloss said he would not say that all urticaria was due to food allergy, this, too, was a disease of multiple etiology, but many cases of urticaria were due to protein intolerance.

ENERGY METABOLISM OF A TWO MONTHS' OLD CHILD FED ON A PROLONGED PROTEIN RICH DIET.

DR. RAYMOND HOOBLER, Detroit, declared that the problem of determining the optimum quantity of protein necessary for the growing organism had been the subject of many investigations. The injury, if any, of feeding large quantities of protein to an infant had not been studied to the extent it deserved. Dr. Howland stated in his Harvey Society lecture that there was every reason to believe that the amount of protein furnished a healthy nursing infant represented at least a sufficient quantity and could not be very much in excess. However, since only 80 per cent. of the nitrogen of human milk was available (the other 20 per cent. being in the form of urea and other extractives) one might, when feeding cow's milk where practically all the nitrogen was available, reduce the quantity of protein at an amount equal to 80 per cent. of that supplied by the mother's milk. Whether a child were fed naturally or artificially it was evident that protein up to a maximum of 7 per cent. of its caloric need would meet all requirements. The question arose, "Can any harm come to the growing organism through the feeding of an excess of protein." To answer this a plan was outlined by Professor Lusk by which it was decided to begin with a low protein diet and to determine basal metabolism for this child and then gradually increase the protein content relatively and actually, maintaining the fat and carbohydrate content as nearly on a level throughout the observation as possible. In all thirty-seven periods of one hour each were studied.

The infant chosen for these experiments was a healthy infant two months old. The first four days he was fed on one-third whole milk

with 5 per cent. dextromaltose during which time the basal metabolism was determined. The child was then placed for one day on slightly increased protein and the following day was put back again on basal metabolism diet; this continued each alternate day, gradually increasing the protein intake, until the last five days of the experiment when the child was placed on maximum quantities of protein in the form of 'Eiweiss' milk prepared at the Walker Gordon Laboratory. The protein on certain of these days was increased by the addition of nutrose and on the last day double strength 'Eiweiss' milk was fed. The clinical condition of the child was normal up to the last two days of the series when it was noticed that he no longer took an interest in his surroundings, would not smile and play and seemed gradually to lie in a semistupor when not sleeping. The pulse was slower, and there were times when the respirations were decidedly irregular. The stupor continued for three days after the experiment as closed, then gradually lessened so that within one week the child was normal again. During the first days of the experiment the weight gradually increased but there was a rapid loss during the last five days. The quantity of urine diminished greatly and the stools became yellow and watery. The temperature was found to be above normal at no time but on the contrary was slightly below normal. The above clinical condition seemed chargeable to the large quantity of protein ingested and constituted an entity which had already been suggested under the term "Eiweissnährschaden," analogous to that found when carbohydrates were given in too large quantities over a prolonged period. The results obtained were remarkably uniform and established beyond question the sleeping metabolism for that infant on this particular food.

The investigation showed that: 1. Protein retained for growth causes no increase in metabolism. 2. Protein oxidized caused an increase in metabolism varying with the amount oxidized. 3. The cause of the increased metabolism is the stimulation produced by the amino-acids and their products, derived from protein decomposition. 4. When large quantities of protein are fed along with insufficient carbohydrates and fat, even though ample calories to cover caloric need may have been given, there is a drain on the fat and carbohydrate stored in the body. Protein food though greatly in excess cannot be substituted for the need of fat and carbohydrate. 5. The proportion of protein fed as advised and taught is much in excess of the need.

DR. HOWLAND said that this work which had been presented was interesting as showing the deleterious effect of high proteins. In work which he had presented four years ago he had shown that protein acted as a stimulant to general metabolism and while more protein could be consumed this was done at the expense of other food elements. Glycogen was stored up in excess of the normal amounts and also the products of other constituents of food with the result that the injurious effects of these other food elements on the organism was greater than when normal amounts of protein were fed.

With high protein ingestion there was also an earlier retention of the mineral salts.

DR. TALBOT said that one curious fact was that in feeding high protein, if the protein was given in the form of cow's milk, the symptoms of protein excess appeared much sooner than when the protein was fed in other forms.

DR. HOOBLER said there were many other points in connection with this investigation which were not brought out in the paper. The metabolism was low during the first hour and increased each succeeding hour. There was a lower metabolism for the sleeping hours.

A FURTHER STEP IN THE ADAPTATION OF AN ARTIFICIAL FOOD TO HUMAN MILK.

DRS. H. J. GERSTENBERGER, H. D. HASKINS, H. H. MCGREGOR and H. O. RUH presented this study. They described the Friedenthal milk and stated that they had started out with the idea of making a fat for Friedenthal's milk that would meet the following requirements: first, approximately the same per cent. of low fatty acids as were contained in breast milk, and, second, approximately the same saponification, Reichert-Meissl, iodine numbers, etc. Dr. Gerstenberger then came across a statement of Arnold's to the effect that a mixture of 86 per cent. lard and 14 per cent. cocoanut oil of certain saponification, Reichert-Meissl and iodine numbers, would give a mixture containing the same numbers that were found in breast milk fat. Such a fat would float on the top of Friedenthal's milk unless homogenized. They then learned of Nieman's method of washing and emulsifying butter. The authors found, however, that practically no fatty acids were removed by repeated washing of butter with cold water; that an emulsion of the fat could not be obtained when it was added to Friedenthal's milk; that Nieman was enabled to emulsify his mixture because he added a large per cent. of cereal in the form of cornstarch; that washing butter oil with hot water removed but slightly more of the low fatty acids; that this amount was so small as to be negligible; that it was impossible to rid process butter with which the authors worked, of the rancid odor and make it useful. Having acquired the use of a large homogenizer, the Friedenthal milk with both cold water washed and hot water washed butter was put through this homogenizer and perfectly homogenized. Most of the infants fed on this milk vomited and had thin yellow or yellowish stools. The authors then prepared a mixture of lard and cocoanut oil, according to Arnold's suggestion, added this to Friedenthal's milk and found that it was also perfectly homogenized by the homogenizer. Various combinations of lard, cocoanut oil, cod-liver oil, and cocoa butter were prepared, added to Friedenthal's milk, homogenized, and fed to various infants. The clinical observations were not long enough to be deemed worthy of report except to state that the babies vomited less and had more normal stools than those fed on the original Friedenthal milk.

or Friedenthal milk with washed butter fat. They continued their observations taking into consideration the work of Osborne, Mendel, Brüning, Funk, Hess, Friedenthal, Posner, Edelstein, Csonka, and others, and had produced a milk which gave the following analysis: protein, 1.1; sugar, 7.07; fat, 4.54; salt, 0.43. The following points with reference to this study might be emphasized: 1. The giving of an artificial food containing fat of approximately the same qualitative characteristics as breast milk fat meant a distinct step in advance toward the more complete adaptation of an artificial food to breast milk. 2. This change in the quality of the fat for the artificial food did not apply only to low fatty acid content of the fat but also to many of its other characteristics. 3. The homogenizer was a machine that made it possible to suspend such fat in a food that in other respects had also been made similar to woman's milk—like Friedenthal's milk. 4. The homogenizer represented also the practical means for adding other substances of whatever nature they might be. 5. This whole scheme made the manufacture of a milk that could be given to young infants as well as to older infants without dilution probable, and this meant, especially if the product could be sold at a relatively low cost, an accomplishment of great practical importance both to the family physician and the family as well. 5. The manufacture of the food did not represent a difficulty in keeping the bacterial content extremely low.

DISCUSSION.

DR. COIT asked Dr. Gerstenberger if he was able to tell the caloric value of this milk.

DR. GERTSENBERGER replied that they had calculated the caloric value of this milk in only two proportions. With 4.5 per cent. fat the caloric content would amount to 770 calories and with 3.5 per cent. fat it would be 670 calories.

DR. HOOBLER said that in the work recently done in the study of fats the distinction had been made between the two kinds of fats, those from glandular tissues and those from the nonglandular. To the latter type belonged olive oil, lard, tallow, cotton-seed oil, etc. Careful observations made on animals fed on nonglandular fats showed that the animals were not sufficiently nourished by this type of fat. They might appear to be all right and might even increase in weight, but there must be a further indication of proper nourishment than increase in weight. There must be the capacity for reproduction. Animals fed on the nonglandular fats could not produce offspring. With this knowledge it was proper to inquire definitely whether food such as had been suggested would fulfill in every respect the standard that they wished to give.

HOMOGENIZED OLIVE OIL AND FAT-FREE MILK MIXTURES IN CASES OF DIFFICULT FEEDING.

DR. MAYNARD LADD, Boston, said that in a paper read before the New England Pediatric Society in February, 1915, he had called attention to the possible application of the principle of homogeniza-

tion of liquids of different densities to the modified milk mixtures in infant feedings. At that time he reported results obtained by replacing cow's milk with olive oil, the emulsion being produced by the homogenizing machine invented by Gulin of Paris. The homogenization was brought about by a powerful pump which forced the mixture through finely ground agate valves against great pressure. After describing the process more in detail, Dr. Ladd stated that the chemical composition of the milk was in nowise changed by the process, but in cases of milk and cream mixtures, the physical condition was so changed that the fat could no longer be separated by the usual cream separators. In making the Babcock fat test more acid must be used and centrifugal action continued for a longer time. The taste of the milk was decidedly improved by this process, particularly that of pasteurized milk. As the process prevented the separation of the fat, homogenized creams could readily be pasteurized. Disturbances of emulsion brought about by rising temperature and transportation were prevented by this process. If all these things were true the process would theoretically yield a more digestible milk mixture. This milk had been used in Fariot's "Gout de Lait de Belleville" successfully and he claimed that it was taken as successfully as breast milk. When rennin was added to the homogenized milk, the curd which resulted was a homogenous flaky paste, resembling closely the curd of human milk. The most interesting application of this principle of homogenization was in connection with the fat constituent of milk modifications, especially in so-called cases of fat intolerance. It was a question whether it was the fat *per se* which caused this interesting symptom-complex of simply the peculiar quality or reaction of some part of the fat of cow's milk. This question had led him to experiment with vegetable oils, and fats of other animals, such as lard and cod-liver oil. With the homogenizing machine they had now the opportunity of combining such oils and fats with milk or milk and other ingredients. If they could separate in a pure state and recombine into a homogeneous mixture the necessary food elements for an infant, they had advanced to an interesting stage of experimentation to determine some of the possible primary causes which started up the strain of symptoms leading to the digestive explosions so often seen in the artificially fed infant. It was possible, for instance, by this method to combine an almost pure olein, or palmitin or stearin, with fat-free skimmed milk and so eliminate almost entirely the influence of the various fats of cow's milk. They might combine a vegetable fat with precipitated casein or a fat-free lactic acid milk and test its value in acute diarrhea and other conditions in which the ordinary fats of milk were not well tolerated. Dr. Ladd related the histories of several cases in which he had tried olive oil in a fat-free lactic acid milk. In two other cases he had used 1.5 olive oil in a malt-soup mixture. The results justified the hope that such cases could be given a food of higher caloric value by this method, with less disturbance of nutrition and greater conservation of strength than by the methods they were now using. If they were to fairly test the application of the

olive-oil malt-soup mixture they should select their cases from those that had been carefully fed in the past and failed to respond. The economic aspect of olive oil was a matter of importance, if it should be found that they could combine this with fat-free milk. Dr. Ladd reported a number of cases fed on mixtures of olive oil, maltose, protein, limewater, barley starch in percentages suited to the individual cases in which the results were very satisfactory and which warranted the hope that further investigation would confirm the promise held out by this method of modifying milk.

THE TOTAL NONPROTEIN NITROGEN AND THE UREA OF THE BLOOD,
AND THE PHENOSULPHONEPHTHALEIN EXCRETION IN INFANCY
AND CHILDHOOD.

DR. WILDER TILESTON, New Haven, Conn., reviewed the work of Folin and Dennis in the estimation of the nonprotein nitrogen and urea in the blood and that of Roundtree and Geraghty for the estimation of kidney function by the phenosulphonephthalein test, which he had used for a basis for his comparisons. Dr. Tileston found that the total nonprotein nitrogen and urea of the blood in childhood was about one-half to two-thirds that of the adult. In this series of children the phenosulphonephthalein excretion varied from 35 to 64 per cent. for the first hour and from 17 to 41 per cent. for the second hour. Taking the two-hour period this excretion was found to be 78 to 81 per cent. on an average. This was a higher excretion than was observed in adults, where the variation was from 50 to 80 per cent., for the two-hour period, but was frequently below 70 per cent.

In investigating the nonprotein nitrogen and urea in the blood and the phenosulphonephthalein excretion in diseased conditions, ten cases of lobar pneumonia were observed. In nine of these it was found that the figures were normal for the total nonprotein nitrogen and urea. In the tenth case there was but a trifling increase. This was contrary to what was found in adults, in whom it was shown that about 70 per cent. of the cases gave 75 milligrams or over almost double that found in children.

The phenosulphonephthalein excretion varied from 17 to 86 per cent., a very wide variation, with an average of 57 per cent. The case that showed 75 per cent. was not distinctly different from that showing 17 per cent.; both had albumin with casts and both recovered. In one case of scarlatina they had found no variation in the phenosulphonephthalein excretion and an increase in the nonprotein nitrogen and urea, and that was a marked case of uremia, that showed 64 milligrams total nonprotein nitrogen and 42 urea nitrogen, and two-thirds the total nitrogen was urea. The phenosulphonephthalein excretion averaged 63 per cent. in five of these cases and the figures for the nitrogen were normal. One case of pneumonia showed a heavy albumin at the height of the disease and this case showed normal nonprotein nitrogen and urea. The albuminuria was only transitory and disappeared with the crisis. To sum up

it might be said that nonprotein nitrogen and urea showed a less tendency to increase in disease in childhood than in adult life. There is no doubt that it was an important guide as to the condition in nephritis if there was a high nitrogen percentage, but in the normal individual one could allow for considerable latitude. A rising nitrogen in adults was an indication of some danger of uremia.

DR. MORSE said that Dr. Hill had been making similar tests and had obtained the same results as those of Dr. Tileston. He found that phenosulphonephthalein excretion higher in children than in adults; he also found that in a number of cases of nephritis the phthalein excretion was not much interfered with, hence it would seem that this test would not prove as useful in children as in adults.

DR. FREEMAN said that some cases of nephritis passed as much as 90 per cent. of the phenosulphonephthalein in two hours. One child passed only 3 per cent. in two hours and yet recovered; such a result seldom occurred in an adult.

DR. HENRY KOPLIK said that a low degree of phthalein excretion was not inconsistent with recovery. He had made comparative tests and found that there might be a very severe nephritis and a quite good phthalein excretion (60 per cent.) in two hours. On the other hand, there might be a comparatively high excretion and the patient not recover. However, one should take this test before undertaking an operation in children. This was impressed upon him by a case in which a decapsulation was performed and the child went into uremia; if they had made the phthalein test it might have been possible to have protected the child and tided him over until he was in a better condition to withstand the operation.

DR. TILESTON, in closing the discussion, said that the phthalein test was only of value at the time it was taken and did not necessarily indicate whether the patient would succumb or recover. He recalled one case in an adult where there was a very high nitrogen retention, even to 150 milligrams and yet with the relief of obstruction that patient recovered.

THE VALUE OF THE X-RAY IN INTRATHORACIC LESIONS IN CHILDREN.

DR. ROWLAND G. FREEMAN, New York, stated that disappointment in the use of this means of diagnosis might result from expecting too much from it. Alone it was generally of little value, but like other evidence, in combination with a clinical history and physical signs it might be conclusive. Auscultation in determining the character of intrathoracic lesions, was of materially less value than auscultation in combination with percussion, and auscultation and percussion aided by a good x-ray plate might fix a diagnosis that might otherwise remain obscure, for the x-ray would show lesions in the chest of which one could obtain no knowledge by any of the means of physical diagnosis. X-rays of the abdomen in children were frequently disappointing. Radiographs of the chest, however, in children were of material aid in diagnosis. The x-ray was probably of most value in making the diagnosis of miliary tuberculosis; often it was of value in determining a pneumonia of which one got no

physical signs; in making a differential diagnosis between empyema and pneumonia; or in corroborating a diagnosis of diaphragmatic hernia, while in lesions of the heart it furnished reliable information as to enlargement, modification of the shape of the heart in dilatation, or the presence of exudate, and it would often differentiate plastic exudate from fluid. Clear fluid gave no shadow while pus formed a shadow. The presence of air in the chest was also well shown by the x-ray and if there occurred a combination of air and pus one got a pus level which was very characteristic. The question often arose whether a murmur heard over the heart was a so-called hemic murmur or a murmur due to a damaged valve in the heart. In such cases an x-ray picture gave one an excellent basis for an opinion as to the origin of the murmur. In diseases of the heart in children the x-rays gave a most valuable indication of the amount of damage to the heart by the size and shape of the heart shadow and successive pictures provided one of their best means for the control of exercise in these cases. For such control the temperature and pulse rate were of great value, but the x-ray picture would occasionally change their method of treatment to the advantage of the patient. Another condition well shown by the x-ray was the enlargement of the thymus gland which gave a broad shadow above the heart. Enlargement of the bronchial and mediastinal lymph nodes might also be brought out by the x-ray. The x-ray had also given corroboration of a diagnosis of diaphragmatic hernia. In conclusion, Dr. Freeman stated that the x-ray furnished most important means in reaching a definite diagnosis of intrathoracic lesions. It should not be neglected in any obscure case. It was particularly adapted to children, as one could get a better picture of a child usually than of an adult, and because children even when sick could be carried to an x-ray laboratory.

Dr. Freeman illustrated his paper by an interesting lantern-slide exhibit showing instances where the x-ray had been of special value as a help in making the diagnosis.

DISCUSSION DR. FREEMAN'S PAPER.

DR. HOWLAND could not agree that the x-ray showed the enlargement of the thymus gland. In practically all instances in which the pictures had apparently indicated an enlarged thymus and the subject had come to autopsy death was proven to be due, to some other cause. It seemed to him that the x-ray more often led one into error than it gave assistance in making a diagnosis of enlarged thymus. With reference to the diagnosis of fluid in the pericardium by the pericardial angle, the x-ray might also be misleading. With a certain amount of fluid in the pericardium the angle became obtuse, but when the pericardium was completely filled with fluid the angle again became acute. So that with a very large amount of fluid one might be led into error by the x-ray.

DR. KOPLIK said one should be very cautious in permitting a radiograph to make a diagnosis for him, this was especially true when there was thickened pleura and a cavity. He related an

instance in which the radiologist made a diagnosis of cavity and insisted upon an operation, but physical examination showed a pneumonia of the lower lobe, and a pneumonia simulating a cavity in the upper lobe. The radiologist changed his opinion but not in time to have avoided an operation if that procedure had depended upon him. He had one case diagnosed as thickened pleura when fluid was present. Another discrepancy was when the picture showed spots they said there was a tuberculous process in the lung, but of this they were not always certain. They needed further information based on a comparison of *x-ray* pictures and post-mortem findings before they could rely upon the *x-ray* plate in making a diagnosis.

DR. DUNN said he would like to agree with what Dr. Koplik had just said. They should have more comparisons between *x-ray* plates and postmortem findings. He had had three cases in which the radiologist diagnosed the presence of fluid but in which no fluid was found. So far as miliary tuberculosis was concerned they had found it repeatedly in cases in which the *x-ray* had not shown it. In most cases the *x-ray* did not show it unless there was a great deal of exudate. They had found that the *x-ray* did not agree with the actual findings in one-half the cases.

DR. HOLT said that he had sent a certain case to different radiologists on successive days. The reports had come back some thing like this: Monday, pneumonia; Tuesday, tuberculosis; Wednesday, pneumonia; etc. In one instance in which the radiologist made a diagnosis of miliary tuberculosis with cavity in the upper lobe of the lung, it was found at autopsy that a chestnut meat had lodged in the bronchus, the blood-vessels had become engorged and an emphysematous lung had been diagnosed as "tubercular lymph nodes." The *x-ray* was very misleading and it was a dubious procedure to base a diagnosis upon it.

DR. GIDDINGS said that at Phipps Institute they had been trying to diagnose alveolar tuberculosis by the *x-ray*; in 50 per cent. of the cases the diagnosis based on clinical findings was not corroborated by the röntgenological examination. In eighteen bodies studied lately the *x-ray* had failed to differentiate an enlarged thymus from enlarged bronchial lymph nodes.

DR. MORSE said that the *x-ray* was a help in making a diagnosis if taken in combination with other findings, but that it was brains and not the *x-ray* that made the diagnosis.

DR. COWIE said there were sometimes spots on the flat plate that looked like tubercles and that the flat plate could not be relied upon, but if they used the stereoscopic figure they could see the bronchi in their natural position. The *x-ray* was only an adjunct to be taken in combination with signs elicited by percussion, the leukocyte counts, etc.

DR. HAND thought the *x-ray* was of great value and the more it was used the more it would be appreciated, but we did not lay stress enough on its limitations in pneumonia and empyema. It would not show how far the lesion was from the chest wall. In

the diagnosis of heart conditions the x-ray was of great value. The x-ray would show whether there is any hypertrophy of the chambers of the heart.

DR. FREEMAN, in closing, said he was not at all surprised at the discussion, in fact he had brought these slides because he felt that the value of the x-ray was not appreciated. These slides showed that there were cases in which the x-ray was indispensable in clearing up a diagnosis. Dr. Freeman said it was his own feeling that many physicians expected too much of the x-ray. As an instance, recently one of the hospital internes said to him that their radiologist did not give him the diagnoses of the cases. Dr. Freeman had replied that if he wanted the diagnosis he should go to the radiologist and tell him all he knew about the case and then the radiologist would discuss the diagnosis from his point of view. The radiologist should not be expected to make a diagnosis. In certain instances such as have been shown by the slides the x-ray shows conclusively conditions that other signs failed to indicate.

TRANSPOSITION OF VISCERA IN AN INFANT.

DR. ADAMS said the baby had been attended first by his assistant and had been blue from the time of its birth. It was unconscious at times. There was a complete transposition of the viscera about which his assistant had said nothing. He first saw the baby when it was about ten weeks old and the heart and liver were completely transposed. An examination of the heart revealed all sorts of murmurs. He told the mother the child might get better. He saw the baby in April when it was eight months old and it was much better; it had had no attacks of unconsciousness and blueness for some time. The examination of the heart now showed the second sound all right but the first sound was obliterated. At the present time the baby was alive and well, but he did not think the foramen ovale would ever close.

Dr. Adams exhibited a lantern slide that showed the transposition of the viscera.

(To be continued.)

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Influence of Feeding and of Illness on the Growth of the Brain in the First Year of Life.—Wolf Sawidowitsch (*Monatsschr. f. Kinderheil.*, Bd. xiii, Nr. 5, 1914) says that there are two methods of studying the growth of the brain: first, by weighing and measuring the brains of children postmortem: second, by following the growth of the skull and brain in the living child. By the last method we find the results of growth as influenced by the kind of food used, by the use of a single food, or by the failure of nutrition due to gastro-

intestinal troubles. We also learn within what bounds repair of stunting is possible during the first year. Since the growth of the brain is parallel with that of the skull the author measured the skulls of 125 children from three weeks to seventeen months of age. He gives as his conclusions: that in a normal, healthy, well-developed child under either natural or artificial feeding, we may observe the same curve of skull development or an interference with skull growth. A diet lacking in fat, such as a carbohydrate diet causes a disturbance of the general growth of the skull and brain, coincident with a general failure of nutrition and growth. Such brains are found to have less than the normal development and growth. Children fed on full milk or condensed milk have large heads. All disturbance of nutrition, due to either failure of feeding or disease, cause failure of growth. In some cases of the exudative diathesis there is no failure of brain growth. In rickets no influence of the disease on brain growth is noted. The head appears larger than normal through an improper proportion of the length and breadth of the skull. The height is too small in proportion to the great length and breadth of the skull. The brain contents are not affected, but the small stature of rachitic children is out of proportion to the size of the skull. With growth and increase in weight goes increase in the growth of the brain. With disturbed nutrition during the first months of life, lasting for some time, the brain recovers its growth during the first year. If the trouble lasts too long the lack of normal growth in the first year is not repaired.

Protective Vaccination for Varicella.—Ed. Handrick (*Monatsschr. f. Kinderheil.*, Bd. xiii, Nr. 5, 1914) says that Kling inoculated children who had been exposed to varicella with serum derived from the pustules of the sick children, with a view to obtaining prevention of the disease. After vaccination in this manner there were seen at the site of inoculation typical varicella blebs which matured and dried in the normal manner. In some children a modified form of the illness occurred. When this inoculation was carried from one child to another there appeared to be a preventive effect. Of ninety-five cases exposed to varicella, thirty-one were inoculated. Only one of these took the disease. Of the sixty-four unvaccinated children forty-four took the disease. The author repeated this experiment on three small groups of children with the following results. He found that of 127 inoculated children, forty-five later developed varicella. He therefore, believes that we have not yet attained a practical method of prevention of varicella by this method.

Remote Results of Calcium Treatment of Spasmophilia.—P. Rohmer (*Monatsschr. f. Kinderheil.*, Bd. xiii, Nr. 5, 1914) says that there is no doubt that administration of calcium preparations is the best known method of treatment of spasmophilia. There is a great difference in the amount of absorption in different cases. Large doses of calcium, up to from 4 to 8 grains of the chlorate, produce effects on the spasms in a few hours. By continuing the same dose for a longer period we get permanent effects and the excessive electrical excitability disappears permanently. This is not in any sense a

specific for spasmophilic conditions, but acts symptomatically only. If after a short use we discontinue the calcium the symptoms return. Phosphated cod-liver oil has a specific effect in causing absorption of calcium and its retention. The author believes that a combination of the two forms of treatment will give a permanent cure. He has made use of this combination with excellent results. He reports eight cases treated successfully. Spasm ceased at the end of two days and never returned. The electrical hyperexcitability ceased and the cure was permanent.

Shortening of the Healing Time of Bone Necrosis after Operation.

—Carl Bayer (*Jahrbuch f. Kinderheil.*, Dec., 1914) says that the slow healing of large cavities after operations for osteomyelitis, diseases of the bone medulla, or removal of sequestra, and also the poor results obtained and the dangers to which the patient is exposed have caused surgeons to seek for some means of hastening repair. It has been attempted to draw together the remaining tissues and fasten them with small nails or sutures so as to make the aperture as small as possible. This saves time for the patient and the surgeon; but in some cases there is so large a cavity and of so irregular a contour that poor results are obtained. Bier and others attempted osteoplasty to fill up these cavities. The cavity left by the sequestrum was cleansed and dried. Straight incisions were made through the soft portions at the ends of the operative site so as to make the scar as nearly linear as possible. The skin, periosteum and bits of bone left are drawn together so as to fill the cavity. But there are still septic portions left in these cavities and these remain a source of danger to the patient. After necrosis this method has little value. The author places his dressing under an Esmarch bandage so as to get as dry a wound as possible. He found that the insertion of portions of the skin and periosteum is the best and cleanest method of closure. There are cases in which the whole diaphysis has become necrotic and is a sequestrum. All this mass must be carefully removed. Granulations must be scraped away with a sharp spoon. Often a central abscess of the canal is opened. The whole canal is irrigated with 1 per cent. sublimate solution, then with sterile water. The whole canal is made as smooth as possible but with care not to thin the bony walls too much. It is astonishing how quickly the periosteum builds new bone. The deep cavity is reduced to a flat hole covered with overlapping flaps of periosteum. In this over the remaining skin, is laid a small, long roll of iodoform gauze, which is sutured in place, making pressure down into the cavity, and is retained by wadding and carefully placed bandages. After removing the Esmarch bandage the limb is elevated. The bleeding is not great. The first dressing is left in place from fourteen to fifteen days. The grafts are found adherent to the bone and the wound reduced to small compass. The author gives histories of eight cases treated in this manner with success; healing was complete. The shortening of the time of healing is marked.

The Paradimethylamidobenzaldehyde Reaction of Ehrlich in the Urine of Scarlatina, Measles, and Diphtheria of Children, and

Various Mixed Infections.—E. Rachmilewitsch (*Jahrbuch f. Kinderheil.*, Feb. 8, 1915) has investigated the diagnostic value of the Ehrlich reaction in 300 patients at the Kinderkrankenhaus at Petersburg. Cases of scarlet fever, measles, diphtheria, and mixed infections underwent the test. In scarlet fever he obtained the reaction up to the twentieth day. He has found the reaction in only 80 per cent. of scarlet-fever cases. A red color was found in only 20 per cent. In the other 60 per cent. the color was slight after warming and brownish. The height of the color did not compare with the amount of the exanthem. Of thirty cases there were five with weak reaction hardly noticeable on the third to fourth day of the disease. The 20 per cent. of negative reactions showed often a marked exanthem and the clinical picture was that of a true scarlatina. The reaction lasted from two to six weeks. In some it was slight one week and strong the next. In 15 per cent. of measles cases it was positive. In diphtheria in $\frac{1}{3}$ per cent. there was a positive reaction. With mixed infection of measles and diphtheria there were 50 per cent. positive reactions. Measles complicated with scarlet fever gave 17 per cent. of weakly positive. Scarlet fever with secondary measles gave 50 per cent. positive. With a combination of all three diseases there were 8 per cent. weakly positive. Thus a diagnosis can be made by this reaction between scarlet fever and diphtheria. In serum disease the reaction was negative. The author is unable to understand how it is that there is a greater percentage of positive reactions in mixed infections than in simple diseases.

Diseases of the Accessory Nasal Sinuses in the First Year of Life.

—A. Onodi (*Jahrbuch f. Kinderheil.*, Feb. 8, 1915) has collected fifty-three cases of diseases of the accessory nasal sinuses under ten years of age. The author says that the size and even the existence of these cavities has been questioned and falsely given by rhinologists and pediatricians. He gives careful measurements of all these cavities at ages from one to ten years. Of the fifty-three cases collected by the author twenty-three followed scarlatina: eight cases were in new-born children. There were cases of sinus involvement and thrombophlebitis of the longitudinal sinus. These cases are accompanied by a severe acute catarrh of the nose, and some of them are cured spontaneously, but most of them require early and thorough operation. These lesions may complicate any of the infectious diseases, especially measles, scarlatina, and diphtheria, severe colds, and erysipelas. The bacteriological examination shows streptococci and staphylococci as causative organisms. Symptoms are high fever, pus in the nasal cavity, and inflammatory swelling of the soft parts over the cavity involved. There may be periosteal abscesses, fistula, and symptoms of meningitis, and thrombophlebitis. The therapy is early and radical operation. The results of such operations are very good.

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ORIGINAL COMMUNICATIONS

THE NEED OF INSTRUCTORS AND INSPECTORS AS HOSPITAL OFFICERS.*

BY

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As a text under this title I cannot do better than make a quotation here and there from your valuable and important report of October of last year ("Committee on Hospital Efficiency, Philadelphia County Medical Society" (1)). This monograph voices the general dissatisfaction with the "enormous amount of waste involved in the current methods of operating hospitals"—an estimated material waste of 20 per cent. and a still greater waste of effort by duplication of work. It draws attention forcibly to the need of a standardized plan of operation and to the *general absence of written standard practice instructions*. "The hospital," it says, "should define clearly the rules and regulations governing the ordinary procedure for every department so that even when there are frequent changes in the personnel of the medical staff, the nursing staff, or the administrative staff the policy and practice of the hospital will be continuous." Under the heading "Efficiency Rewards" it goes on to lay down the rule that "in scientific departments the professional recognition given to a member of the staff should be as far as possible directly proportional to his professional success." And it truly states that "in

* Read at the joint meeting of the Philadelphia and New York Obstetrical Societies at Philadelphia, April 1, 1915. The speaker in opening dwelt at some length on the service rendered by Philadelphia to the cause of efficiency by the combined action of the hospitals of the city.

many hospitals this principle is not recognized and promotion is made to depend not on efficiency but on seniority of service." It might add also on less avowable motives. Your report proceeds to review the recommendations made by committees from the American Medical Association and the Clinical Congress of Surgeons of North America and the American Hospital Association for comprehensive study and for classification and standardization of all the hospitals in the United States and the general belief that some such body as the Carnegie Foundation should be asked to undertake this study. Conceding that a satisfactory plan has not yet been formulated, suggestions are made for the most important matters; namely, that a schedule for classification be provided; that a few typical institutions in each group be studied; and that standards be defined by which to measure efficiency in each group.

Until such action is taken I venture once more(3) to urge that it is manifestly the part of each and every hospital to do two things. First, to hold up the hands of those who have laid out this clear and comprehensive program, putting pressure upon the above-named societies to drive that program forward; and secondly, to undertake some one small part of a study which shall contribute a point of value to the grand total. Here I suggest trial of a method generally in use in the best factories, or its adaptation to our special needs, since it would seem as if from the industrial plants we could transfer at least two functionaries into hospital practice. We are assured by an efficiency engineer(4) well informed in hospital practice that "many of the problems involved are not only similar but identical and that many of the solutions found to those problems in the shop can be carried over bodily into the field of hospital management." "As a matter of fact in determining units of measurement the problem of the hospital is less difficult than that of the industries because of the fact that the field contains a larger percentage of highly educated men and women who are therefore better able to appreciate the scientific method applied to their problem." Continuing, Gilbreth gives the warning that there are some concessions necessary before "you can expect to do any valuable work in introducing the science of management into the hospitals. The first is that you must submit to having accurate measurements applied to your present methods and practices. You must recognize that for ages there has existed a disinclination not only on the part of surgeons and doctors, but on the part of all those connected with the hospital, to allow their work to be inspected and the methods and the results to be measured. The second concession that must be made is in the willingness to

allow a man not trained either in surgery, medicine, or hospital management to apply the measurement and determine the resulting standard. This necessity is a question of the present only, or of such time as hospital managers shall have received training in the science of management. Scientific management's first aim is to install a self-perpetuating system for standardizing and using the best of present knowledge and practice. Another concession to be made is that no one is fitted to handle every kind of function of hospital management, and that the work will be better done, if it is divided or functionalized and each division put into the hands of a man specially fitted and specially trained to do the work of his function. You must recognize also the necessity of specializing such functions as inspection and discipline. We emphasize this particularly, because in the hospitals these are the two fields in which specialization is most opposed. Without proper inspection no accurate records of performance can be obtained. Without specialized discipline no true cooperation can be obtained, and cooperation, after all, is the maintaining force."

To carry on the idea on which emphasis has just been laid, to wit, that there are parts of the workings of scientific management that are susceptible of being transferred at once to our work, let us consider the two questions of instruction and inspection. Let us get clearly in mind that scientific management reallots many duties or responsibilities and tries to make one man or group of men responsible for a given activity, such as inspection. This is an idea obnoxious to doctor and institution. We are used to an organization in which each service or division is largely a law unto itself; in a hospital which is a law unto itself. Each service, each institution, works out its own problems with little or no systematic study of the effective work of other services or other institutions in the same line. Combination studies or studies of organization are little practised. Hospitals happen. Just as any architect thinks he can build a hospital without previous experience, so any doctor believes he can turn out staff regulations and assignments. Experts in each have only begun to develop. As there is a best average requirement or standard for, let us say, a hospital of 200 beds in an average town, so there is a best organization of its professional staff. As it is, "miscellaneous duties are heaped upon the members." The work is rarely divided according to any principle. Functions are not clearly visualized and therefore not definitely specialized. Yet two of the groups of duties are easily differentiated. One set has to do with the care of the ill or injured person. The other group is executive or general. The

staff always has been officered. To various members committee duties always have been given. Functions have always been cut into little pieces and parceled out to several men. Meanwhile the gaps are unfilled. There lacks a clear or adequate introduction of any member to his duties, or any supervision of the early drill of every member in his work; or even a plotting of his duties. And there is lacking everywhere so far as I know a detailed annual report on the efficiency and work done by each member of the staff.

In first taking up the latter question, and in trying to work out a form for an annual or semi-annual report on the work of doctors in hospitals or dispensaries I have studied the methods of the Army(5) and Navy(6), the Department of Agriculture(7), and the recommendations of the Civil Service Commissions(8), national, state and municipal, and solicited advice from certain members of these organizations best qualified to give it. As a result of this study I offer a tentative form adapted to our use, a form erring on the side of overfullness, because it is easier to condense or lop off than to enlarge. And I quote somewhat fully the best paper this review has encountered, with the object of attempting to make clear the principles that should guide us.

Griefenhagen(8) writes: "*There are three general methods of arriving at an efficiency rating which may be termed respectively; first, the method of simple judgment markings; second, the method of markings on a relative standard; third, the method of markings on an absolute standard.* The term, "*judgment markings,*" is applied to the system in which the rating is given to the efficiency of an employee by an immediate superior well familiar with his work and intended as a summary of such superior officer's judgment in regard to the value of the employee's service. It summarizes the actual performance, the standard; and the ratio. In the method of marking efficiency according to a *relative standard*, the actual performance is measured against an arbitrary standard performance. The value of this standard performance is derived by assuming that the services of the ideal employee are, say, 25 per cent better than the services of the average employee in the same grade. According to this system, employees whose work is no better nor worse than the average in the same grade, receive a marking of, say, 80 per cent, all those marked under eighty are those whose work is below the average and those marked above eighty are those whose work is above the average. This scheme prevents markings crowding up to the maximum and insures a relative indication. In marking efficiency according to an *absolute standard*, the actual

performance of the employee is measured against a standard performance derived from investigation and study as the maximum which may be expected. Both the standard service and the actual service have definite values and the ratio which represents the efficiency can be worked out mathematically.

"The *considerations* entering into the efficiency of an employee in any position are *many and complex*—they must take account not only of the employee's actual individual output and performance, but of the effect of his work, activities, and conduct on the efficiency of the whole organization of which he is part. Where any system for determining efficiency other than that of simple judgment markings is adopted it is impractical and impossible to rate the service in its entirety. The result may be accomplished, however, by considering the various factors in the service, which factors should take account of all the features and aspects of the employment weighted according to their relative importance. Each factor may then be considered independently and the efficiency of the employee in regard thereto may be rated, all other features of his services being disregarded.

"In rating the efficiency in a factor *any one of the systems* of marking mentioned above which seems best adapted under the circumstances *may be used*. The general process of determining the factors of employment which are to be rated independently as relating to the total efficiency of the employee, fixing their relative weights, deciding upon the system of rating to be used in each case, and setting up standards, either absolute or relative, may be termed the preparation of an efficiency marking schedule. . . .

"Decision as to the *proper officer to collect the data* and record the markings of efficiency, the contents of his report, and the information to be entered upon the final efficiency record depends largely on the kind of employment, the form of schedule, the purpose for which the record is intended, and the facilities at the command of the Civil Service Commission. In general, the Commission should *outline a form of record* upon which original data serving as the basis for efficiency ratings, shall be permanently recorded. This record should be open for inspection to representatives of the Commission at all times. The information forwarded in the efficiency report might well include the markings in each factor together with the details relating to punctuality, attendance and discipline which are matters of fact and have a value independent of their bearing upon the general rating of efficiency. The entry to be made on official efficiency records, . . . should be as

simple as possible. It is most desirable that it be *reduced to a single percentage figure*.

"In reaching a decision in regard to the details of the efficiency record system to be adopted the criterion should always be: Will the expense of obtaining and maintaining the record exceed the value of the record in increasing the efficiency of the service? It will be found as a general rule that a *system which is 50 per cent accurate will probably have about 90 per cent of the practical value of a system which is absolutely accurate*. It will also be found that by far the greater number of uses and applications of an efficiency record system require only a relative rating. . . .

"The processes involved in the preparation and *keeping of efficiency records* have many desirable effects in indirectly *increasing the efficiency* of the service. The process of standardizing and classifying duties and uniformity of grades is essential as a preliminary step in outlining a schedule for the rating of individual efficiency The process of standardization, and the determination of the superior officer who shall furnish the data upon which markings are to be based invariably bring the internal organization of each department to light, make it necessary to define clearly the responsibility of each superior officer, establish definitely the lines of authority, eliminate conflicts, indicate defects in the scheme of organization and often make the remedy obvious. *A record of the conduct and attitude of employees must indicate conformity or lack of conformity with regulations and this naturally necessitates the preparation of such regulations, which in itself is a desirable thing*. It is coming to be one of the accepted principles of scientific management that those in authority in an organization, either themselves or through agents appointed for the purpose, should outline the proper procedure to be followed in conducting the business of their respective departments, and should set forth specifically how the members of the organization are to conduct themselves in connection with the performance of their respective duties. In the organization of many public bodies, this principle has been sadly neglected and there is perhaps no better way to secure its adoption than through the installment of a system of efficiency records.

"Perhaps the greatest indirect value which *efficiency ratings* have lies in the fact that they *insure supervision on the part of superior officers* of the work of their assistants and subordinates and therefore of the activities of their respective departments. If there were not other uses made of efficiency records as compiled,

the moral effect on employees and the spur given to superior officers would justify their introduction." (*Italics are mine.*)

SUGGESTED FORM OF REPORT ON EFFICIENCY OF EACH MEMBER OF PROFESSIONAL STAFF.

- | | |
|---------------|------------------------|
| Position held | Average number of beds |
|---------------|------------------------|
- A. *Quantity of work*; months on duty; total visits required; total visits made; total hours given to hospital (or dispensary); vacation; illness; absences, excused and unexcused
Estimated committee service
 - B. *Quality of work* (thoroughness, promptness, rapidity)
 1. Preliminary examinations, consultations
 2. After-care, examinations for discharge, instructions to follow-on
 3. Histories, personal inspection, personal notes, reviews, studies on end-results
 4. Laboratory work, supervision, personal work
 5. Training of hospital staff, nurses, dispensary staff
 6. End-results (Codman method) 2; each individual's errors scored by
 - a. lack of technical skill
 - b. lack of surgical judgment
 - c. lack of care or equipment
 - d. lack of diagnostic skill
- Failures grouped also by
- a. patient's enfeebled condition
 - b. patient's unconquerable disease
 - c. patient's refusal of treatment, and by
 - d. surgical calamities
- Methods; notes on full histories by Chief; review by Consultant or Efficiency Committee; summary of history by clerk; choice by staff of certain operations as tests (*e.g.*, suppuration in clean laparotomies)
- C. *Personality*; integrity; disinterestedness; obedience to rules; team-play; kindness; cheerfulness; enthusiasm; and ability to inspire these
 - D. *Progressiveness*; study of literature; travel to other clinics; membership and attendance at medical societies; originality; researches; publications
 - E. *Executive ability*; initiative; originality; organizing power; control
 - F. *Teaching*; staff, nurses, dispensary; students; public clinics
 - G. *Inspections*; number, by Trustees, Consultants, Hospital Inspector.

Certain defects to be heavily scored—such as lack of judgment. Percentage to be given under each heading to be determined. Positions differ. Some positions will have a score for executive work, and some for teaching, and others will not. This will involve grouping and reporting such positions separately, but any man's abilities in either of the above matters should be noted, even if not marked on a score.

Even though the general practice and procedure in a given hospital have not been completely reduced to writing the instructor and inspector can begin work with the regulations already in force. From various committees they can secure rulings to be submitted

to the Staff and Trustees. This will be particularly fostered if the duties of each committee are clearly defined.

COMMITTEE FUNCTIONS. (Sample in outline.)

*Efficiency Committee, EC.** Reviews of order of work, of equipment, of instruction, of time and cost and results. General policies; reports to Trustees.

*Professional Staff Committees.** One man each, chief or associate; with a substitute, who will usually be one of the younger men

1. *House Staff, HSC.* Finding internes, provision of instruction; report on quantity and quality of work done by each; with constant cooperation with Superintendent, who has executive control
2. *Operating Room, ORC.* Harmonizing and standardizing equipment; procedure, and lists (instruction cards)
3. *Ward, WC.* Standard procedure; diets and drugs, and formulæ; nursing (instruction cards)
4. *Histories, HC.* Also Library; publications; standard nomenclature of diseases, injuries and operations; filing, indexing. (This committee only necessary until a standard history and regulations have been adopted and tried out)
5. *Dispensary, DC.* Professional relations and nominations, but Dispensary has its own meetings, and joint clinics; its executive control under the Assistant Superintendent.
6. *Postgraduate Work, PWC, or Student Teaching.* (This committee may also be dispensed with when methods and regulations have been fully worked out in practice)

Planning

- (a) Committee on *Order of Work, OWC.* May be Chiefs from three main services, with Superintendent and Senior Resident; Chairman, Chief Surgeon
- (b) Committee on *Instruction Cards, ICC.* May be the six Staff Committee men plus Superintendent and Senior Resident; Chairman, History Committee man or Instructor
- (c) *Time and Cost* and
- (d) *Discipline* can be in hands of Superintendent

Trustee	}	or may cover more ground
The Superintendent		
One Doctor		

Two or three members of Executive Committee of Trustees	}
Superintendent	
Senior Visiting Surgeon	
Senior Visiting Physician	
Senior Visiting Gynecologist-Obstetrician	

*The Efficiency Committee may be, as in Philadelphia.

COMMITTEE FUNCTIONS: COMPLETE DEFINITION (sample).
Operating Room Committee.

SYMBOL: ORC

TASK:

- (a) To gather ideas and information pertaining to equipment, routine, standard names of tools, in other clinics, and submit improvements to the Surgical Staff, with recommendations
- (b) To prepare, to submit to Surgical Staff, and when endorsed, to enforce, for average conditions, a standard or minimum procedure in sterilization, preparation for operation in general and for particular classes of operations; in team-work at operations, etc.
- (c) To secure agreement among Surgical Staff as to standard equipment (*e.g.*, knives, suture materials)
- (d) To order new equipment and repairs for OR outfit
- (e) To recommend to Staff candidate as anesthetist and arrange for anesthesia
- (f) To oversee OR nurse's methods, cataloguing, entry in book
- (g) To arrange with Instructor for drill in technic of the specialists, associates and assistants

PERSONNEL: Member of Surgical Staff (preferably senior or visiting); substitute to act in his absence, a younger man on Surgical Staff

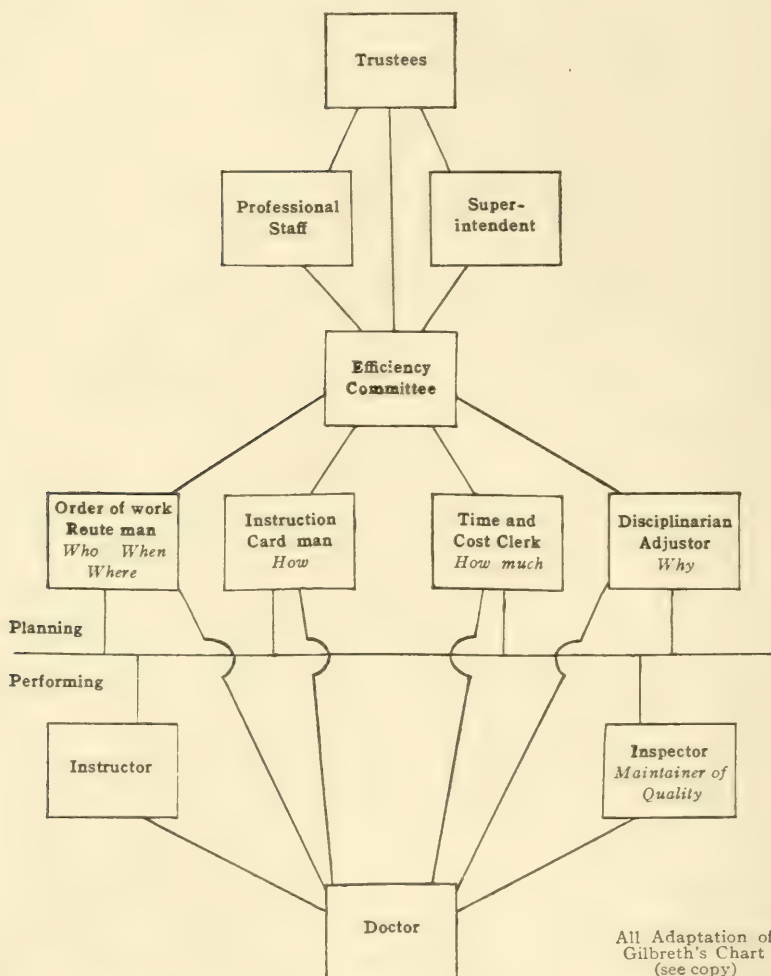
METHODS:

- (a) Instruction of professional staff and house staff and OR nurse as to routine of OR (or deputizing same)
- (b) Assignment of studies in OR technic to members of staff
- (c) Report to Staff meetings (in writing for annual report)

EQUIPMENT:

- (a) Operation book, (list of operations performed by each individual)
- (b) Card Catalogue of instruments, with cut of each, under standardized names
- (c) Standardized samples of certain parts of outfit, such as needles, gut, etc.
- (d) Loose-leaf book covering standard pre-operative care, standard or average technic, and after-care

Before we come to consider the work of the instructor and inspector in detail we need to determine how the newer methods provide for standards. The professional work should be divided into *planning* and *performing* as in the accompanying chart.



INSTRUCTOR:

TASK:

- (1) To secure a set of written practice instructions and instruction cards or sheets
- (2) To ascertain the best methods of instruction
- (3) To coordinate the teaching in various departments
- (4) To supply instruction cards
- (5) To delegate to others certain parts of the teaching, as for example
 - (a) To Assistant Superintendent of Training School, instruction of nurses in the wards
 - (b) To the Operating Room Committee the instruction of Operating Room nurse, and of operators concerning agreements as to standard or average practice and outfit

- (c) To President or Secretary of Professional Staff introduction of new members of the Staff to their duties

Hours

Salary

Equipment: Instruction cards or leaves

Binders

Certain sample teaching outfits

Nomination: by Staff and Superintendent to Trustees

INSPECTOR:

Title: as above, or Recorder, or Clinical Recorder or Registrar

TASK:

- (1) To familiarize himself with the regulation of the hospital in general and with the written standard practice instructions of the Professional Staff in particular
- (2) To inspect or to arrange for inspection (at stated times) of all strictly medical or surgical or laboratory work of the hospital
- (3) To tabulate, summarize, and report upon conformity or nonconformity with the standards as in (1)
- (4) To prepare or cause to be prepared an efficiency record for each member of the Professional Staff and House Staff and Dispensary Staff according to the schedule adopted by the Professional Staff and Trustees
- (5) To delegate to others certain parts of these inspections and reports if deemed wise, for example
 - (a) To Consultant, on quality of work done by Senior Visiting
 - (b) To Senior in a service, work done by his direct subordinates
 - (c) To Dispensary Committee, work done by Dispensary Staff
 - (d) To Superintendent of Training School, nursing in general
- (6) Hours
- (7) Salary
- (8) Equipment
- (9) Nomination; by Staff and Superintendent to Trustees

168 CLINTON STREET.

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X-RAY TREATMENT OF UTERINE FIBROIDS.*

BY

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ABOUT two years ago I had the privilege of reading a paper at a meeting of the New York County Medical Society, on the "X-ray Treatment of Uterine Fibroids, Menorrhagia and Metrorrhagia" (1).

At this time I reported seventy-five cases treated according to the Albers-Schoenberg technic. This consists in dividing the abdomen and lower part of the dorsal region into left and right fields, and giving each field in divided doses, a quantity of ray amounting to about 10 X during each intermenstrual period.

With this method we succeeded in getting satisfactory results in about 65 per cent. of the cases treated.

There was one case out of every three, probably chiefly submucous fibroids, in which nothing could be accomplished, although our idea

* Read at a meeting of the New York Obstetrical Society, May 11, 1915.

of a satisfactory result at this time, in most cases, did not go beyond a symptomatic improvement, while to-day our demands in this respect are much more exacting.

It was at this time that the Freiburg school began to publish its modified technic, with the astonishing report of 100 per cent. cures in the treatment of these cases.

In the early fall of 1913 at Dr. Brettauer's suggestion, I went abroad to study this technic, and to visit various gynecological clinics to see their method of treatment and to compare their results with those published by the Freiburg school.

Among other clinics I visited were Bumm's at Berlin, Wertheim's at Vienna, Doederlein's at Munich, Menge's at Heidelberg, and Krönig's at Freiburg.

I found that all the clinics I visited have *in toto*, or with slight modifications adopted the Freiburg technic and that their results practically corresponded with those published by Krönig and Gauss, that is 100 per cent. cures.

In fact, I found that an operation for fibroids, at any of the above-mentioned clinics, was a rare operation, only performed when x-ray therapy was contraindicated.

I was so impressed by what I saw, that I decided to bring back with me the complete equipment as used in Freiburg, adopt the technic, and use it exclusively in the treatment of these cases.

As the report of the cases I treated with this technic will show you, I feel that I am justified in sharing their enthusiasm, as my results were practically the same as that reported by these clinics, that is, a satisfactory result in every case treated.

In fact I do not know of a single ailment amenable to Röntgen therapy, where we can look forward to a satisfactory termination, with the degree of certainty, as in a case of properly chosen uterine fibroid.

As to the cases best adapted to this treatment I take it for granted that we all concede that where the same result can be accomplished by a conservative treatment as by means of an operation, the procedure which does not include the operative risk, is always to be preferred.

This operative risk is not a negligible quantity. Even in the most competent and careful hands it is worthy of consideration.

Other important factors to be considered are the severe psychical and physical manifestations that generally follow a complete hysterectomy, and usually persist for years.

While Röntgen therapy does not enable us to avoid these mani-

festations completely, it does help us to modify their severity to a considerable degree.

The change of conditions produced is much more gradual, and it gives the system considerable more time to become accustomed to them.

The dangers connected with the x-ray treatment of uterine fibroids as administered to-day, with proper technic are practically *nil*. By carefully measuring our dosage, using rays of proper penetration, filtered through aluminum and other filters, the danger of producing a severe x-ray dermatitis has been practically eliminated.

As the years roll on, and as we carefully follow the thousands of cases treated by this method, the fear of possibly producing some permanent injury to the other abdominal organs is also gradually disappearing. If the case has been treated to its proper termination, that is to the production of a permanent amenorrhea, the danger of possible recurrences can also be disregarded.

Krönig and Gauss of Freiburg, to whom we are indebted for developing the most satisfactory technic for the treatment of these cases, and who probably have the largest number treated to their credit, consider all uterine fibroids amenable to Röntgen ray treatment with the following exceptions:

1. Pedunculated fibroids partly showing through the cervix.
2. Cases in which gangrenous degeneration of fibroids is suspected.
3. Fibroids accompanied by carcinoma or those that have undergone sarcomatous degeneration.
4. Fibroids which led to acute incarceration of the bladder.

They make no allowance for the size of the fibroid nor the age of the patient.

I thoroughly agree with them as far as the size of the fibroid is concerned. The majority of the patients I treated had large fibroids, reaching up to the umbilicus.

But as regards the age of the patient, I must say that I found it extremely difficult to produce a complete and permanent amenorrhea in very young women.

In one case of a woman of thirty-two years (Case II) I was compelled to give nine complete series, with some intravaginal raying, until I finally succeeded in producing an amenorrhea, which although lasting for six months now, I am not at all convinced will prove permanent.

The fibroid which originally reached up to the umbilicus, is hardly palpable at present, and the last few menstruations she had preceding the amenorrhea were practically normal. Perhaps

we are wrong in trying to produce a permanent amenorrhea in these cases. I think a temporary amenorrhea with a diminution of the fibroid and normal reestablishment of menstruation is much more ideal, and I believe this can often be accomplished.

I have a number of these cases, one as young as seventeen years where I succeeded in getting an amenorrhea lasting up to ten months, followed by a reestablishment of normal menstruation.

Of course it is rather difficult always to accomplish this with certainty. There is too much of the individual element involved, so that it is always possible that the amenorrhea will become permanent, or that on the reestablishment of menstruation the profuse bleeding may again start at any time.

For this reason in women under forty years unless an operation is contraindicated or objected to, in cases in which a partial operation can be performed, leaving sufficient behind to permit them to continue with their menstruation, it is perhaps preferable to operate.

But in cases where a complete hysterectomy must be done, *x-ray* therapy should unquestionably have the preference. Especially as we are now getting reports of cases, where these women after having gone through sufficient *x-ray* treatment to diminish the size of the fibroid and to produce a temporary amenorrhea, became pregnant and gave birth to normal children followed by a normal course of menstruation.

In the treatment of these cases, where we aim merely to produce a temporary amenorrhea, lasting up to about one year, I found that the fractional or Albers-Schoenberg technic is preferable to the Freiburg method.

The cases best adapted to Röntgen therapy are those nearing the menopause. There is no question that the older the patients are, the nearer the climacteric period, the surer and quicker are they influenced by *x-ray* therapy.

Another contraindication that may be mentioned is the fibroids accompanied by large ovarian cysts. The *x-ray* will not diminish the size of these cysts, so as long as they have to undergo an operative risk there is no reason why they should have to bear the additional burden of *x-ray* therapy. At one time Albers-Schoenberg advised against *x-ray* therapy in very profusely bleeding and anemic women, on the ground that *x-ray* therapy may temporarily increase the loss of blood. With the Freiburg technic this does not hold good.

I think it is just these anemic women who make poor operative risks and who should by all means be given the benefit of *x-ray* therapy. Some of the patients I have treated bled for months continuously, with a hemoglobin below 35 per cent. when treatment was begun. They all did well.

As regards the question of submucous fibroids, at one time this was considered a contraindication to Röntgen therapy, but with the improved technic they probably yield as readily as the others. A fair percentage of the cases I treated with satisfactory results were unquestionably submucous fibroids.

The important points in connection with the Freiburg technic(2) are as follows:

1. Dividing the abdominal dorsal and gluteal regions into a number of small fields (twelve to the abdomen and six to the dorsal and gluteal region).

2. Cross-fire administration of the rays through these fields. This means keeping the tube at various inclines, to permit the ray to pass through the ovaries and uterus at different angles.

3. The use of rays of a certain degree of penetration. They found that the penetration best adapted was from $8\frac{1}{2}$ to 9, Bauer.

4. The filtration of all rays through 3 mm. aluminum. In addition to this they also use a filter of a few layers of "Satrap papier" (thick photographic paper) and one made of loofah sponge to filter out the secondary rays produced by the aluminum.

5. Massive doses. All the fields are treated one at a time, in rotation, each field receiving the maximum dose of toleration. This has been found to be from 15 to 20 X as measured under 13 mm. of aluminum.

Each series of treatment lasts from three to four hours, and they are repeated at three weeks' intervals.

The number of series necessary to effect a cure in women above forty years is from three to six.

No patient is considered cured until she is completely amenorrheic. Even after she has become so, she receives one or two additional series, so-called consolation series.

Many of the patients (probably one-half) are affected shortly after treatment by a so-called "Röntgenkater."

The symptoms are very similar to that of seasickness, consisting of a general malaise, headache, vertigo, nausea, sometimes vomiting and on rare occasions, a slight attack of colitis.

These symptoms generally last from twenty-four hours to a week.

I found that treating the patients on a fairly empty stomach and following the treatments with the drinking of copious alkaline solutions, such as milk of magnesia, had a tendency to ameliorate these symptoms.

I will not go into any detail as regards to the apparatus used, as I do not think this would be of much interest to you, besides I have already described it in a previous communication(3).

Up to a few months ago I followed the technic as described above without the slightest variation. Since then, with the advent of the Coolidge tube, we have been able to make a few modifications, that in no way affect the efficacy of the treatment but lessen the hardships accompanying it.

With this tube, on account of its much more intensive power, we have been able to cut down the time required for the administration of each series to about one-half. That is to one and three-fourths to two hours.

We are also using harder rays, of considerably more penetration.

I think that the choice of $8\frac{1}{2}$ to 9 Bauer penetration as advised

by the Freiburg school, was chiefly due to the limitations of the tubes as existed at the time.

With the Coolidge tube we are enabled to get homogeneous rays of much higher penetration, so that at present I am using rays of slightly above 10 Bauer, equaling a 9-inch spark gap.

I have also substituted a 4-mm. aluminum filter instead of a 3-mm. for additional safeguard against a dermatitis.

The amount of rays administered to each field at present is 20 X measured under 4-mm. aluminum.

I found that even the most sensitive skin will tolerate this.

I have never seen anything worse develop than a slight superficial redness, which generally disappears in a few days.

This tube opens a new era for Röntgen therapy and with its aid we ought to get quicker results with less discomfort to the patient.

The time I have been working with it has been too short to justify my making comparisons, but its advantage of infinitely greater power and ease of regulating penetration and the value of our ability to standardize dosage can hardly be overestimated.

Its only disadvantage is that on account of its power in untrained hands, it may prove extremely dangerous.

Up to the present time I have treated about 100 cases of uterine fibroids, twenty-two of which were treated in strict adherence to the Freiburg technic.

Of these, four are recent cases still under treatment. One was brought to me with a severe x-ray dermatitis produced by previous treatment. This patient was extremely anxious to avoid an operation, so I attempted to treat her by blocking out carefully the affected area and treating all around it. The area I had to block out was considerable; on account of this I was unable to give her anything like the quantity of ray she should have received.

This patient received three series, when on account of the urgency of the symptoms, it was necessary to discontinue treatments, and the patient had to undergo an operation.

This case is probably looked upon by the various gynecologists she consulted later, as one of the terrible examples of x-ray therapy. As a matter of fact the fault was not with the x-ray, but to the lack of proper filtering of the ray, and the nonadherence to the prescribed technic for the treatment of these cases.

I have no doubt that with the proper technic, this dermatitis might have been avoided and the patient saved an operation.

Probably the best way to enable you to judge the results accom-

plished is by giving you a brief history of each of the cases treated by the massive dosage method.

CASE I.—Mrs. L. F., aged forty-seven. Referred by Dr. L. Stieglitz, uterine fibroid. Uterus about the size of three and one-half months' pregnancy.

Symptoms.—Profuse menstruation and considerable heaviness and pressure in abdomen.

Treatment.—Began Dec. 22, 1913, finished Feb. 23, 1914 (nine weeks). Number of series given, four (806 X). Amenorrhea after second series (three weeks).

Result.—Amenorrhea, diminution of fibroid. Fundus hardly palpable above symphysis, complete disappearance of pressure symptoms. Patient is perfectly well to-day, no recurrence of any symptoms.

CASE II.—Miss E. K., aged thirty-two. Referred by Dr. Brettauer. Uterine fibroid. Fundus reaching within two fingers of umbilicus.

Symptoms.—Irregular and very profuse menstruation, considerable clots. Backache, pressure symptoms, abdominal pains and very marked sensitiveness over abdomen.

Treatment.—Began Dec. 29, 1913. Patient had five series, and a series of intravaginal raying before amenorrhea was produced, which lasted five months, when there was a slight menstrual flow lasting one day. Additional series were given, followed by an amenorrhea lasting for three months, when she again had a scanty menstruation. Another series were given the end of Feb., 1915, no sign of menstruation since. She had in all nine series (2085 X).

Dr. Brettauer finds that there is a very marked diminution in the size of the fibroid. Fundus hardly palpable above the symphysis.

This case illustrates the difficulty in producing permanent amenorrhea in young women.

We succeeded in this case in getting a marked diminution of the fibroid with an amelioration of the symptoms. Perhaps in these cases a reduction in the size of the fibroid, removal of symptoms, temporary amenorrhea, with a reestablishment of normal menstruation is to be preferred to a permanent amenorrhea.

CASE III.—Mrs. E. J. L., aged fifty-one. Referred by Dr. D. D. Goldstein and Dr. Brettauer. Uterine fibroid. Two distinct fibroids palpable, each about the size of an average fist.

Symptoms.—Very profuse menstruation lasting two weeks or more, patient very anemic (hemoglobin 40 per cent.) with all its accompanying symptoms.

Treatment.—Began Dec. 15, 1913, finished Feb. 27, 1914. Number of series given, five (twelve weeks). Amenorrhea produced after two series (three weeks). Hemoglobin at the end of treatment 55 per cent.

Result.—Diminution of fibroid, amenorrhea.

Dr. Goldstein reports that on examination at the end of Feb., 1915, one year after treatments were discontinued, he finds the uterine

myomata considerably shrunken, patient's general condition very good and the amenorrhea persisting.

CASE IV.—Mrs. M. M., aged forty. Referred by Dr. E. F. Hoffmann. Uterine fibroid. Fundus reaching within two fingers below umbilicus.

Symptoms.—Very profuse menstruation. Marked anemia (hemoglobin 40 per cent.) with all its accompanying symptoms. Fundus originally reached above umbilicus. Patient had previous fractional x-ray treatments for some months, also radium treatment. These treatments somewhat diminished loss of blood and brought the fundus down to two fingers below umbilicus.

Treatment.—Began Dec. 12, 1913, finished Jan. 23, 1914. Number of series given three (six weeks), amount 559 X. Amenorrhea produced after two series (three weeks.)

Result.—Amenorrhea and marked diminution in the size of the fibroid.

Examination made some months after treatments were discontinued showed fundus palpable about three fingers above symphysis. Patient's general condition very good. Hemoglobin 75 per cent. Amenorrhea persisting.

CASE V.—Mrs. A. S., aged forty-two. Referred by Dr. Jacobus. Uterine fibroid. About the size of six months' pregnancy.

Symptoms.—Patient had large percentage of sugar. Menstruation somewhat profuse. For the past four years had considerable bladder pressure symptoms. Had to void urine very frequently. Often had considerable trouble in starting urine.

Treatment.—Began Jan. 26, 1914, finished May 20, 1914. Number of series six (fifteen weeks). Amenorrhea produced after three series (six weeks).

Result.—Amenorrhea, diminution of fibroid. All bladder pressure symptoms disappeared.

Examination in April, 1915, shows patient in very good condition. Hemoglobin which at beginning of treatment was 65 per cent. is now 85 per cent. Fundus hardly palpable above symphysis. No return of bladder symptoms. Amenorrhea persisting.

CASE VI.—Mrs. A. B., aged forty-eight. Referred by Dr. Brettauer. Uterine fibroid.

Symptoms.—Profuse menstruation with severe abdominal pains preceding it, accompanied by general distress and digestive disturbances.

Treatment.—Began Jan. 25, 1914, finished Feb. 15, 1914. Number of series given two (three weeks). Amenorrhea after second series.

Result.—Amenorrhea and diminution in size of fibroid. This patient only received two series because as amenorrhea set in, she decided that she would take no further treatments unless she required them.

Examination fourteen months after treatments were discontinued shows patient in good condition with amenorrhea persisting.

CASE VII.—Mrs. B. W., aged forty-seven. Referred by Dr. E.

Lewi. Uterine fibroid. Fundus palpable about half-way between symphysis and umbilicus.

Symptoms.—Very irregular and profuse menstruation lasting twelve to fourteen days, considerable clots.

Treatment.—Began March 13, 1914, finished June 5, 1914. Number of series, five (twelve weeks). Amenorrhea produced after third series (six weeks).

Result.—Amenorrhea and diminution of fibroid. Hemoglobin which was 55 per cent. at present 70 per cent. General condition much improved.

Dr. Lewi reports that on last examination, nine months after treatments were discontinued, fundus is only slightly palpable above symphysis and amenorrhea is persisting, patient's general condition is very good.

CASE VIII.—Mrs. C. R., aged forty-eight. Referred by Dr. Brettauer. Uterine fibroid, reaching almost up to umbilicus.

Symptoms.—Very profuse and irregular menstruation. Patient has been subject for the past five years to periodical attacks of very severe hemorrhages, followed by great weakness and depression, lasting for weeks each time.

Treatment.—Began March 29, 1914, finished June 19, 1914. Number of series five (twelve weeks). Amenorrhea produced after second series (three weeks).

Result.—Amenorrhea and marked diminution of fibroid. Patient's general condition much improved. Dr. Brettauer reports that the size of fibroid is diminished about two-thirds. Fundus palpable about 2 inches above symphysis. According to last report, ten months after treatments were discontinued patient's general condition very good. Amenorrhea persisting.

CASE IX.—Mrs. Wm. N., aged forty-nine. Referred by Dr. Brettauer. Uterine fibroid, reaching up to umbilicus.

Symptoms.—Irregular and profuse menstruation lasting for twelve or fourteen days, followed by extreme weakness and depression.

Treatment.—Began April 6, 1914, finished June 8, 1914. Number of series four (nine weeks). Amenorrhea produced after four series.

Result.—Amenorrhea and marked diminution of fibroid. General condition of patient much improved. Dr. Brettauer reports that fundus is palpable about two fingers above symphysis.

CASE X.—Mrs. J. A. B., aged forty-nine. Referred by Dr. Sternberger. Uterine fibroid, reaching up to umbilicus.

Symptoms.—Bleeding persisting continually with various degree of severity, for more than five months. Backache, dyspnea, extreme nervousness and palpitation. Hemoglobin 50 per cent.

Treatment.—Began Oct. 19, 1914, finished Jan. 11, 1915. Number of series five (914 X). Amenorrhea produced after three series (six weeks).

Result.—Amenorrhea, marked diminution of fibroid. General condition much improved. Hemoglobin 70 per cent. Examination three and one-half months after last treatment, shows fundus palpable

about two fingers above symphysis. Patient's general condition very good. Amenorrhea persisting.

CASE XI.—Miss C. S., aged forty-eight. Referred by Dr. Brettauer. Uterine fibroid reaching almost up to umbilicus.

Symptoms.—Irregular and profuse menstruation, considerable clots, pelvic pressure, and extreme nervousness and depression.

Treatment.—Began Jan. 13, 1915, finished April 7, 1915. Number of series five (twelve weeks). Amenorrhea produced after three series (six weeks).

Result.—Amenorrhea and diminution of fibroid. Fundus palpable about two fingers above symphysis.

CASE XII.—Miss L. J. B., aged forty-six. Referred by Dr. Frank. Uterine fibroid. Two distinct fibroids palpable. Fundus reaching more than half-way between symphysis and umbilicus.

Symptoms.—Irregular and very profuse menstruation, considerable clots, bladder pressure symptoms, patient has considerable trouble in holding urine, dyspnea, palpitation, weakness, nervousness, etc.

Treatment.—Began Feb. 5, 1915, finished Feb. 26, 1915. Number of series two (three weeks). Amenorrhea produced after first series. This patient had previously nine fractional treatments which accounts for the amenorrhea following one series.

Result.—Amenorrhea, marked diminution of fibroid. General condition much improved. Bladder pressure symptoms practically disappeared.

CASE XIII.—Miss S. H., aged forty-four. Referred by Dr. L. Stieglitz and Dr. Brettauer. Uterine fibroid, fundus palpable half-way between symphysis and umbilicus.

Symptoms.—Irregular and very profuse menstruation lasting two weeks or more, considerable clots, pain, severe backache, extreme nervousness, etc.

Treatment.—Began Jan. 6, 1915, finished April 23, 1915, six series.

Result.—There is a marked diminution in the size of the fibroid. On account of the extreme nervousness of this patient, I was compelled to cut the last series short, and a few days later she had a slight amount of bleeding lasting a few hours. This will necessitate another series, which I have no doubt will produce a permanent amenorrhea.

CASE XIV.—Is a young woman of thirty-two years with a uterine fibroid reaching up to the umbilicus. Very profuse menstruation, extremely anemic, with a very serious valvular lesion, on account of which operation is absolutely impossible.

She had five series up to date, amenorrhea produced after the third series. Patient feels very much improved, is able to get about again. For months before treatment was begun she was bedridden, on account of her heart lesion, with the accompanying anemia due to the profuse menstruation. The size of the fibroid is decidedly diminished. On account of her age, Dr. Brettauer advises giving her one or two additional series.

CASE XV.—Mrs. S. S., aged forty-nine. Referred by Dr. Brettauer. Uterine fibroid reaching within two fingers of umbilicus.

Symptoms.—Frequent and profuse menstruation with extreme nervousness. The patient had five series, amenorrhea after the second series. Dr. Brettauer on examination, finds that the uterus is atrophied, with no sign of the fibroid remaining.

CASE XVI.—Mrs. B. G., aged forty-eight. Referred by Dr. Hensel and Dr. Brettauer. Uterine fibroid reaching half way between symphysis and umbilicus.

Symptoms.—Very profuse menstruation, large clots, severe shooting pains down legs. This patient had five series, amenorrhea after the third series. Result, considerable diminution in the size of the fibroid, with complete disappearance of all shooting pains.

CASE XVII.—Mrs. L. H. H., aged forty-seven. Referred by Dr. A. Friedenberg and Dr. Brettauer. Uterine fibroid reaching within two fingers of umbilicus.

Symptoms.—Very profuse menstruation. Patient had been menstruating continuously for twelve weeks. She had five series, amenorrhea after the third. Result, diminution of fibroid. General condition very much improved.

CASE XVIII.—Was practically identical with Case XVII as to symptoms and results accomplished.

CASES XIX, XX, XXI and XXII are recent cases still under treatment,

In looking over the above histories we find that we succeeded in getting a permanent amenorrhea with a diminution in size of the fibroid, in every patient over forty years, 100 per cent.

The average length of time necessary to produce amenorrhea was about six weeks (three series) although a number became amenorrheic in less time than this (two series).

The average number of series given were between four and five.

The nearer the climacteric period, the easier amenorrhea is produced, and the less series necessary.

In the patient, treated below forty years with the Freiburg technic, we succeeded in getting a very marked diminution of the fibroid with an amenorrhea which may or may not be permanent.

The number of series required in these patients are considerably more than in those above forty years.

Probably one-half of the patients treated had a "Röntgen Kat-er" in various degrees of severity lasting from one day to a week.

Another case I want to report to you is very interesting, instructive and probably unique in the history of these cases.

Mrs. I. R. S., aged thirty-two. Referred to me by Dr. Brettauer in Jan., 1912. Multiple fibroids. Patient married ten years, one child eight years old. Began to menstruate at fifteen, fairly regular up to marriage. Then menstruation became much more profuse, lasting

about ten days, five of which she was compelled to stay in bed. After birth of child menstruation was somewhat less for a while, when it became severe again. At this time she was curetted, with improvement for a while. In 1909 she became pregnant, in third month began to bleed, was put to bed for three weeks, but miscarriage could not be avoided. After this patient menstruated every three weeks, extremely profusely, lasting ten days or more, six of which she had to stay in bed. Last menstruation Jan. 15. X-ray treatment began Feb. 1, 1912. Patient extremely anemic and very weak. Between February and August of 1912 patient received thirty-four fractional x-ray treatments. At this time Dr. Brettauer found the patient so much improved that he advised discontinuing treatments. Patient menstruated normally up to November, when menstruation ceased. Dr. Brettauer, on examination March, 1913, found that she was about four months pregnant. Patient was delivered by Dr. F. H. Mosler, who a short time ago kindly sent me the following history:

Mrs. I. R. S. was delivered on the twenty-sixth of July, 1913, of a baby boy weighing $6\frac{3}{4}$ pounds. Both the pregnancy and labor were normal (L. O. A.). The placenta was adherent and removed manually. The postpartum was uneventful, patient up on the tenth day. Baby was weaned on the eighth month and the patient had her normal menstrual period on the following, *i.e.*, the ninth month.

At present she is perfectly well, menstruation normal, and on physical examination presents a small movable anteflexed uterus with two very small fibroids (size of a hickory nut) on the anterior wall of the same.

This is a most interesting and instructive case. This patient had thirty-four x-ray treatments, covering a period of six months, sufficiently to greatly diminish the amount of menstrual flow and to reduce the size of the fibroids.

According to our conception of the sterilizing power of the rays, she should have been sterilized for a long time to come, instead of that she became pregnant four months after treatments were discontinued. Normal delivery, normal child and normal postpartum, and at present, almost three years after treatments were discontinued, we find her menstruating normally, with a small uterus and two very small fibroids giving no symptoms whatever. A most ideal result indeed.

Dr. R. T. Frank reports another case that I treated for him at the Mt. Sinai Hospital, with a similar termination. This was a young woman with a uterine fibroid of considerable size, with irregular and profuse menstruation. She had sufficient x-ray treatments to diminish the size of the fibroid and to produce a temporary amenorrhea. She afterward became pregnant and went through a normal labor with a normal child. These cases prove conclusively that the sterilizing effects of the ray are only permanent where a permanent amenorrhea has been produced. In other cases, with the reestablishment of menstruation, after a short lapse of time, there is the same liability to conception as there has been previously.

In conclusion, I wish to emphasize again that:

1. The dangers of x-ray therapy in the treatment of uterine fibroids, with proper technic, are absolutely none.

2. In cases where we want to establish a permanent amenorrhea, the massive dosage method (Freiburg technic) is decidedly superior to the fractional dosage method, as giving quicker and more satisfactory results.

3. In younger women where we merely aim to get a diminution of the size of the fibroid, with a temporary amenorrhea and a re-establishment of menstruation, the fractional dosage method is preferable.

4. In these cases, in a comparatively short time after the re-establishment of menstruation, the patients may conceive, go through a normal labor and give birth to normal children.

5. All uncomplicated cases of uterine fibroids are amenable to x-ray treatment.

6. The nearer the patients are to the climacteric period, the surer and quicker the results.

7. In these cases properly treated, we can look forward to getting practically 100 per cent. cures.

41 WEST FIFTY-FIRST STREET.

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THE CHOICE BETWEEN OPERATION AND RÖNT-GENIZATION OF UTERINE FIBROIDS.*

BY

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SHORTLY after x-ray therapy had been introduced into gynecology, a few enthusiasts such as Krönig, Gauss, Menge and others insisted that the rays were destined to supplant operation in the treatment of fibroids. The following extracts not only illustrate their attitude,

* Read at a meeting of the New York Obstetrical Society, May 11, 1915.

but also conveyed the threat that unless the profession voluntarily adopted the new method it would be forced to do so at the insistence of the public.

Krönig(1) says: "If, above all, we look at the question from the social point of view of the women concerned, we may at the present time state very decidedly that radiotherapy of myomata is in every way far superior to the operative treatment of the myoma by means of total extirpation or supravaginal amputation of the myomatous uterus. Since it appears from our experience, and as has been shown in a great number of cases, that as a matter of fact, the myomas which do not react to radiotherapy amount to *nil*, then you will readily understand why we in the Freiburger Frauenklinik have abandoned the operative treatment for myoma in all cases in which the choice was at our disposal, except in the rare cases when myoma enucleation appears to us to be indicated. One great advantage of radiotherapy of the myoma over the operative measures I should like to point out, and that is that radiotherapy does not endanger the life of the woman."

Menge(2) threatens: "The gynecologists must, therefore, adopt the new therapy. If they will not do it of their own accord, they will be forced into it by the family physician and also by the public. And, if they continue to hold back, a large part of the myoma material will be passed over to the professional radiologist. That, however, would be deplorable on account of the difficulty of determining exact indications; for the indications are based primarily upon an accurate examination on the part of a competent specialist."

Having used Röntgen rays in the treatment of fibroids and menorrhagias for several years in *selected cases*, I gladly acceded to the request of our Council to try and give a fair statement of what today I would consider the proper criteria in making a choice between x-ray and operation.

The friends of the Röntgen ray claim that its use assures a mortality of *nil*, an absolute lack of failures (Krönig) and avoids the discomforts of operation. The opponents of the method assert that the dangers of raying a sarcoma, or a carcinoma of the uterus, or ovarian malignant growths, and thus losing time until the conditions become inoperable, far outweigh the dangers and mortality of operation.

Röntgenization according to Krönig(3) "is indicated for myomata in all cases of women forty years or over in place of the total extirpation of the genital organs or in place of the supravaginal removal of the uterus." Continuing, he says that myomectomy is frequently

followed by recurrence and that, therefore, . . . "there arise a large number of cases, the majority in fact, in which even in women under forty, Röntgen treatment is indicated in preference to operation."

The contraindications to röntgenization were limited by Doederlein and Krönig(4) to the following five conditions:

1. Pedunculated submucous fibroid partly extruded from the cervix.
2. Gangrenous or suppurating fibroids.
3. Combination of fibroid and endometrial carcinoma.
4. Fibroids in which rapid growth, profuse metrorrhagia and unsuccessful Röntgen treatment makes the fear of sarcomatous degeneration likely.
5. Fibroids causing acute incarceration of the bladder.

To this they add: "If in addition to the myomata, other complicating diseases are present, it is necessary to decide after due reflection, whether these *per se* necessitate an operative interference, in which case the fibroids, of course, would be removed at the same time."

To substantiate his statements Krönig(5) refers to 350 successfully treated cases. A large casuistic gives details of many of these (Gauss and Lembcke(6)). The main object of the treatment appears to have been the attainment of amenorrhea, the secondary object shrinkage of the tumor.

In order to contravert the assertion that the danger of malignancy outweighs the advantages of the method, Miller, from the Freiburg Klinik(7) has published an extraordinary article. In this, by a bewildering array of figures, he *proves* (1), that even if sarcoma is overlooked, not more than 0.8 per cent. of patients can be harmed and that the "theoretical x-ray mortality is 0.63 per cent." in contrast to an operative mortality of 4 to 5 per cent.

The subject of x-ray therapy was first seriously brought to my attention in September, 1912, by Dr. Brettauer, who had seen the treatment applied in Freiburg. Since then I have had a considerable number of patients subjected to the treatment by Dr. S. Stern who to-night is dealing with the technic of the treatment. During the course of these years I have formed my own judgment of the applicability, the utility and safety of the method. The results differ considerably from those of Krönig or Gauss.

In order to have some basis to work on I have gone over my private records and found that of all fibroids discovered at examination, 45 per cent. required some interference. This far exceeds the figures

given by Olshausen who said that only 15 per cent. required treatment. My figures are based upon material in special practice in which cases referred, because of symptoms, naturally predominate. In order to gauge with some degree of accuracy the conditions encountered at operation, I have examined the histories of 419 consecutive cases admitted to the First Gynecological Service of Mt. Sinai Hospital (Dr. J. Brettauer, Attending Gynecologist) in order to determine the ages of our patients, the ratio in which operation was found inadvisable, the proportion of palliative, of radical and of conservative operations, complications and mortality.

TABLE I.

Ages	Not operated	Operated	Hysterec- tomy	Myomec- tomy	Curettage	Explora- tory
20-30.....	4	60	29	25	4	2
31-35.....	6	59	36	18	2	3
36-40.....	5	95	84	8	3	0
41-45.....	0	84	75	7*	2	0
46-50.....	0	62	58	1**	3	0
51. I.....	0	21	19	1†	1	0
Menopause.....	3	10	9	1	0	0
Unknown.....	1	9	8	1	0	0
	—	—	—	—	—	—
	19	400	318	62	15	5

TABLE II.

Number of cases 419; operated 400 (95.47 per cent.); not operated 19 (4.53 per cent.).

Supravaginal hysterectomy.....	276	Exploratory.....	5
Complete hysterectomy (abd.)....	19	Curative operations.....	380
Vaginal hysterectomy.....	23	Palliative operations.....	15
Myomectomy.....	62	No change.....	5
Curettage.....	15		

TABLE III.

Malignancy.....	15				
<i>Carcinoma</i>	<table> <tr> <td> { of uterus.....</td><td>2</td></tr> <tr> <td> { of gut.....</td><td>1</td></tr> </table>	{ of uterus.....	2	{ of gut.....	1
{ of uterus.....	2				
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<i>Sarcoma</i>	<table> <tr> <td> { of uterus.....</td><td>5</td></tr> <tr> <td> { of mesentery.....</td><td>1</td></tr> </table>	{ of uterus.....	5	{ of mesentery.....	1
{ of uterus.....	5				
{ of mesentery.....	1				
Ovarian papillomatous cysts.....	6				

* 6 myomectomies (vaginal route, removal of necrotic pedunculated fibroids by hysterotomy).

** 1 myomectomy and ventrofixation preceded by a vaginal plastic.

† Vaginal hysterotomy for gangrenous infected submucous fibroid, death.

<i>Proliferating Ovarian Growths</i> (Nonmalignant).....	18
Dermoid cysts.....	3
Nonmalignant cysts.....	15
<i>Adnexal Diseases</i> (serious).....	13
Tuboovarian abscess.....	4
Tubercular salpingitis.....	3
Pyosalpinx.....	6
<i>Uterine Conditions</i>	13
Necrotic and gangrenous fibroids (hysterectomy) .	5
Necrotic and gangrenous fibroids (myomectomy) .	7
Tubercular endometritis.....	1
<i>Pregnancy</i>	15
Hysterectomy necessary.....	9
Myomectomy necessary.....	2 (gravidity continued)
Curettage.....	2
Exploratory.....	2
Not operated.....	4 } (gravidity continued)
<hr/>	
Complications absolutely contraindicating rays	74
<i>Less serious complications</i>	
Hydrosalpinx.....	7
Chronic diseased adnexa.....	52
Cystic ovaries.....	34
Complications not absolutely contraindicating rays.....	66
Total complications.....	140 (35.00 per cent.)
Contraindication to rays.....	74 (18.50 per cent.)

TABLE IV.

Mortality.

Operations.....	400
Deaths.....	7
Operative mortality.....	1.75 per cent.
Hysterectomy mortality (6).....	1.89 per cent.
Deaths of cases in which x-ray was contraindicated*.....	4

*1. Sarcoma of uterus, papillomata of ovary, death forty days post-operationem.

2. Large fibroids, pregnancy third month, Basedow.

3. Necrotic fibroid extruding from cervix, sepsis.

4. Large fibroid incarcerating bladder, resection of bladder, ureter implantation.

Mortality *perhaps* avoidable by x-ray 3 (0.75 per cent.)

With the figures given in Tables I-IV as a basis it would appear that using a lowest age limit of thirty-five years, 42.75 per cent. of our patients had no absolute contraindications to the use of rays; with forty years as the limit, 57.5 per cent. might have been röntgenized.

Other things being equal the choice between operation and x-ray treatment would depend upon the certainty with which dangerous complications, especially malignancy, could be excluded. In small tumors with an endometrium accessible to the curet, preliminary curettage can with certainty exclude carcinoma. In larger tumors with tortuous uterine cavity, curettage is less reliable. Sarcomatous changes, unless endometrial, or so far advanced as to be inoperable, will escape diagnosis before operation. Ovarian growths, both benign or malignant can be diagnosticated with certainty, only if they can be palpated separately from the uterine growth. Adherent or impacted cysts may appear to form an integral part of the fibroids, or may impress the examiner as hydro- or pyosalpinges. These latter conditions, on the other hand, cannot be differentiated from cysts with any degree of certainty. The consequence is that conservative gynecologists will be forced to exclude from x-ray treatment cases in which the palpatory findings are not quite clear (impacted, adherent, partly cystic masses), tumors growing rapidly, or large tumors in which the entire endometrium cannot be curetted away for examination. In other words, the very cases in which the operative mortality is from 1.5-2 per cent. are excluded from the benefits of the rays. In the uncomplicated cases the operative mortality is 0.75 per cent. (comparing favorably with Miller's "theoretical" x-ray mortality of 0.63 per cent.).

As x-ray treatment of fibroids is an expensive procedure, costing between \$100 and \$500 (depending upon whether the fractional (Albers-Schoenberg) or the intensive (Freiburg) method of application is used), the poorer patients are automatically excluded, except in well-endowed institutions. The time required to produce amenorrhea in most patients under forty years of age is at least two to three months. If the bleeding has been irregular in character röntgenization must be preceded by curettage and examination of the scrapings. In addition the suspicion of complications makes the choice of x-ray hazardous.

Because of these requisites (expense, time, curettage, absence of complications) I have found it inadvisable to use x-ray treatment in fibroids except in very rare instances. Where necessary or indicated, however, the method is invaluable; thus, (1) if: operation

is absolutely declined; (2) in patients with severe heart disease or grave nephritis who are bad operative risks, and finally (3) in a very small group in whom the psychical trauma of operation must be avoided at all costs. These cases have constituted at the most between 5 and 6 per cent. of all fibroids seen in my private, hospital and dispensary experience.

While the *x*-ray has been a great and indispensable boon in the control of obstinate puberty menorrhagias and metrorrhagias, or similar bleeding occurring during the early years of maturity, its use for fibromyomata is less necessary, though within strict limitations valuable.

Summed up I would say that the Röntgen ray cannot be used with safety:

1. In rapidly growing tumors.
 2. In cases of metrorrhagia where complete preliminary curettage with microscopical examination of the curettings is not feasible.
 3. In complicated cases where ovarian cysts or serious adnexal trouble cannot be excluded.
 4. In fibroids complicating pregnancy.
- That the rays should not be used:
1. Where expense is a factor.
 2. Where time is a factor.
- That the rays are of chief value:
1. Where operation is declined.
 2. Where operation is contraindicated by serious heart, renal or pulmonary lesions;
 3. Where operation is contraindicated because of extreme psychical unrest.

That consequently *x*-ray treatment is applicable to at the most 5-6 per cent. of all patients having fibroids.

983 PARK AVENUE.

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A MODIFICATION OF THE TECHNIC OF ABDOMINAL CESAREAN SECTION.*

BY

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(With five illustrations.)

FROM the time of Numa Pompilius' Lex Regia, about 715 B. C., until the fifteenth century, the mortality rate of abdominal Cesarean section was 100 per cent. The Roman law required the removal of the child from every mother who died during pregnancy at or near term and abdominal section was employed only in such cases.

In 1500 it is reported that a swinegelder of Switzerland delivered his wife by the abdominal route, after midwives and barbers had failed and in 1581 Rousset published the report of fifteen cases, but there is, however, a doubt as to whether or not these were true Cesarean sections.

In 1610 Trautman of Wittenberg did an abdominal delivery for hernia uteri. This case has been generally accepted as the first deliberated Cesarean section and is considered to be the beginning of this operation.

From that time until about the middle of the nineteenth century the death rate was but little better than it had been when the use of Cesarean section was restricted to the dead. It was used only in cases where any other means of delivery was impossible and then only when the conditions were such that failure was almost certain. The cause of death was hemorrhage or infection; there was no suture of the uterine wound; no asepsis or antisepsis.

In 1769 Lebas put three sutures in the uterine wound and left the ends long to remove later. It was not until 1882 that a true or efficient uterine suture was suggested by Säger.

In 1877 Poro advised the supravaginal hysterectomy after the delivery with fixation of the stump of the cervix in the abdominal wound. His operation was so successful that it superseded the former method until the introduction of Säger's operation which promptly placed the operation of Cesarean section at the beginning of the way along which it has traveled for the past half century to its

* Read at a meeting of the Medical Society of the County of Monroe, May 18, 1915.

present place as one of the most beneficent procedures of the art of surgery and one by which an untold economy of life and health has been accomplished.

The essential features of the Säger operation were the placing of eight to ten silver wire sutures through the uterine muscle to close the incision, a fine Lembert suture of silk to cover it, and the employment of extreme antisepsis. You can readily see that while we may change this operation in detail, there yet remains the careful closure of the uterine cut and antisepsis as the foundation on which our present success depends.

During the earlier years when the death rate from classical Cesarean section was so enormous it was but natural for operators to try various modifications which might improve the results. For this reason there were devised various forms of extraperitoneal operation, the attempt being to deliver the child from above the pelvis without going through the peritoneum. In 1823 Baudelocque described an operation where the incision was just above and parallel to Poupart's ligament with blunt dissection behind the peritoneum to the cervix and delivery of the child through this channel. Many used a method described by Pfannenstiel,—a transverse incision just above the symphysis, separation of the recti, pushing up the uterovesical fold of peritoneum with delivery through an incision in the lower uterine segment. All of these operations involve the use of forceps to deliver and were done with the view of preventing peritoneal infection.

Then there have been modifications of the extraperitoneal operations. In 1906 Frank made a cut low in the abdomen and before opening the uterus, dissected up the peritoneum from the anterior wall of the uterus and sewed it fast to the parietal peritoneum, after delivery he sewed these edges together over the uterine cut.

It was claimed that these modifications of the classical section aided in reducing the mortality rate, although the exact effect has not been determined, as they have been used only in cases that were infected or strongly suspected.

Routh gives the death rate in suspected cases at the present time as 17 per cent. and Williams says that where the operation is done after the patient is in active labor the mortality rate is 10 to 12 per cent.

In a series of forty cases under the writer's care the death rate was 10 per cent. and included both primary and late operation on cases that had eclampsia, toxemia, placenta previa, tuberculosis and heart disease as well as contracted pelvis. Many of the patients presented more than one indication.

Of these cases twenty-two were either operated upon while in active labor dating from six hours to two or three days, or even five days or else they were depleted by antepartum bleeding. Nearly every one had been examined by midwives or physicians at their homes

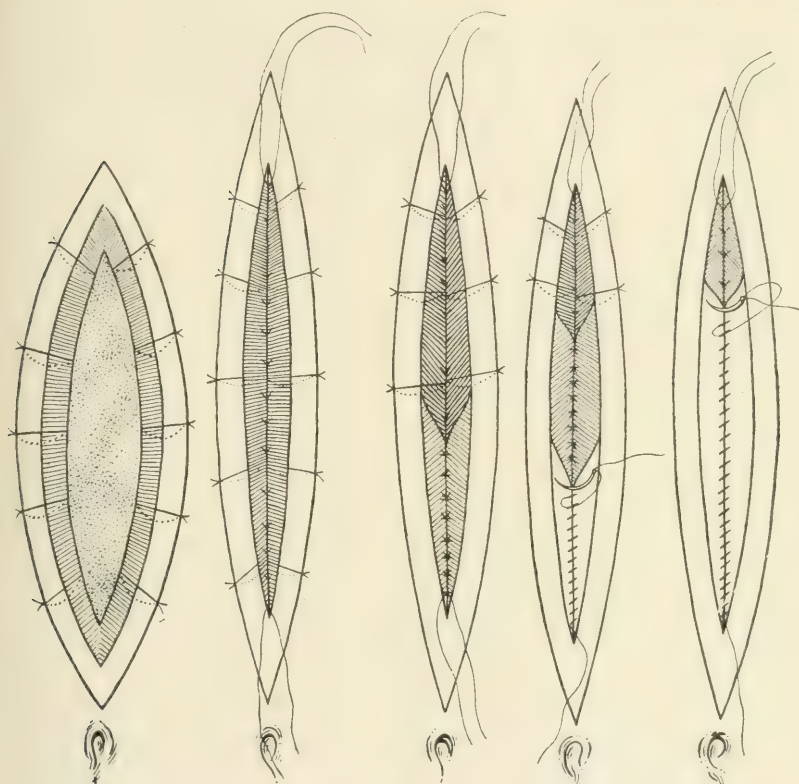


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 1.—Uterus fastened to abdominal wall by temporary sutures before delivery of child.

FIG. 2.—First row of uterine sutures tied before temporary ones are cut.

FIG. 3.—Second row of muscle sutures begun.

FIG. 4.—Second row of muscle sutures in uterus partly introduced and peritoneal suture begun.

FIG. 5.—Uterine muscle closed and peritoneal sutures being inserted.

and a number had had attempts at forceps delivery. In this series of twenty-two cases but one died, which gave a death rate of less than 5 per cent in this class of patients as compared with the 10 or 12 per cent that Williams claims.

From 1882 when Säger described his operation until a few years ago the classical Cesarean section usually meant a long incision and eventration of the uterus before delivery of the child. It was believed that the most important part of the operation was to prevent the escape of the uterine contents into the peritoneum.

A few years ago Asa B. Davis, of New York, modified the classical operation by making a short incision high in the abdomen entirely above the umbilicus. In order to protect the abdominal cavity from being soiled, he packed gauze about the incision before opening the uterus. This method has met with great favor and many operators now use it.

What are the dangers, difficulties and disadvantages with which we meet in doing the classic operation of Cesarean section at the present time? I believe that you who are doing abdominal work will agree with me that one of the greatest dangers in intraabdominal work is trauma of the peritoneum, especially trauma to the intestines and mesentery, with its resultant shock to the sympathetic nervous system. We have learned that this is one of the main causes of post-operative distention and gas pain, even of paralytic ileus and gastric dilatation.

If you are familiar with this operation you will realize how easily the uterus slips down into the pelvis after it is emptied of its contents, unless it is carefully held up into the incision. Even then it is often impossible to keep the intestines out of the field of the operation without using large gauze pads which traumatize the peritoneum, shock the sympathetic, and also promote postoperative adhesions.

Further, this peritoneal shock interferes with the natural defensive power of the peritoneum against infection, and also interferes with the early and free action of the bowels, a function which may be of such vital necessity to a patient with toxemia or eclampsia.

It is my firm conviction that the advantages which seemed to rest with the various forms of extraperitoneal operation were not alone due to the keeping of infective material out of the peritoneum but, as well, to the absence of this sympathetic shock and its resultant troubles.

With these things in mind the writer has sought for some time a means of overcoming these disadvantages without adding to the technical difficulties of the operation such as are involved in the various forms of extraperitoneal operation or their modifications by which the uterus is reached through the lower uterine segment. I am now trying out a slight modification of the Davis operation

which, it seems to me, will, with careful development, be of distinct advantage in most of these cases.

I make the incision in the usual manner, about 10 cm. long and entirely above the umbilicus if possible. By pressure on the sides of the abdomen an assistant holds the uterus firmly up against the abdominal incision while the cut in the uterus is being made.

When the uterus has been carefully opened, and before the child is delivered, the uterine cut is sewn to the abdominal wound either with eight or ten interrupted sutures or possibly by a continuous suture. The uterus is then emptied of child, placenta and membranes but, as will readily be seen, it is impossible for the uterine viscera to get into the peritoneal cavity or for the abdominal contents to get into the way of the operator. There should therefore be a minimum of peritoneal shock. The placing of these sutures will take from one and a half to two minutes but the time so taken will be saved in the further steps because the operator is not bothered with the intestines and does not need to look after pads and sponges in the abdominal cavity or to do an extensive peritoneal toilet.

In closing this incision I find that it is quite easy to place the whole of the first row of uterine muscle sutures before the temporary sutures are removed. In fact a large part of the whole uterine sutures, both muscular and serous, can be placed before the last temporary sutures are cut in the upper angle of the wound. By leaving the permanent sutures in the upper and lower angles of the incision long they are convenient for holding the uterus up in view while the last stitches are being taken.

I have used this method now in four cases, but since the number is so small, I am unable to base any positive conclusions on them. Considering the conditions under which they were done, however, the results in these four cases have been impressive to me, so far as the comfort and rapidity of convalescence was concerned, that I feel that this slight modification in the technic of an operation that has proven its superiority will add its quota of economy in the procedure.

REPORT OF CASES.

CASE I.—Mrs. A. M., aged thirty-six, para-ii. Previous labor was protracted and ended with high forceps extraction of a dead baby. She was admitted to the hospital on March 6, 1915. The pelvis was moderately contracted and of a Naegele type, the measurements being interspinous 22 cm., intercrystal 27 cm., external conjugate, 16.5 cm., right oblique, 22 cm., left oblique 20 cm. and the diagonal conjugate 8 cm.

She had been in labor about fifteen hours when she came in and was

having pains at one- to three-minute intervals; the cervix was completely dilated and membranes unruptured; the head was floating and could not be made to engage by external pressure.

The operation was done in the manner I have described and there were eight temporary sutures used. The child weighed 8 pounds and 12 ounces; thirty-three minutes were taken for the entire operation. The mother's recovery was rapid and entirely free from any gas pain or distention. There was no nausea or vomiting.

In this case the intestine was not touched, was hardly seen, and there was no soiling of the peritoneum.

CASE II.—Mrs. L. C., aged thirty, primipara. The pelvis measured interspinous, 21 cm., intercrystal, 24.5 cm., external conjugate, 17 cm., both obliques, 20 cm. The presentation was a vertex, L. O. A., with the head riding on the symphysis.

On admission to the service the contractions were two minutes apart and severe; the cervix was not taken up or dilated but the membranes were ruptured and meconium was escaping.

While this was a border-line case it was felt that the mother, who was frail and tired from overwork, was not in a condition to stand a prolonged labor with an artificial delivery in the end, so abdominal delivery was offered and accepted.

The operation was done in the same manner as in the previous case excepting that ten sutures were used instead of eight and the time taken in placing these sutures was two minutes. A temporary lapse of the anesthetic allowed the patient to strain just as the last of the temporary sutures was cut and a coil of intestine was pushed into the incision but there was no soiling of the peritoneum.

During the day the patient vomited once and for about an hour she complained of some pain from gas but there was no distention whatever and her convalescence was uneventful.

CASE III.—Mrs. C., aged thirty-six, primipara. Patient was seen at her home in consultation on March 12, 1915. She was historically and apparently in the forty-second week of her pregnancy and suffering from toxemia with albuminuria and many casts. Arterial tension was 190. She had been having rather drastic saline catharsis for several days and a castor oil purge was ordered with the idea that it might induce labor. If labor did not supervene it was decided to interfere the next morning.

The presentation was cephalic with the head freely movable above the brim. Her labor began at 1 A. M. with the rupture of the membranes and she was admitted to the hospital at nine with the contractions three minutes apart and very severe. Examination at this time showed the cervix about one-third dilated with the head riding high and presenting a face at the brim. While version would ordinarily be the procedure of choice in such a case it was felt that the length of time that labor had been in progress and the total absence of fluid within the uterus made it a matter of about even choice as regarded the maternal danger. As they were Catholic and had a passionate desire for a live child, while a further examination showed a firmly closed anterior fontanel, it was determined to do a

Cesarean section. The operation was done about ten hours after the onset of labor and in the manner already described. The convalescence was rapid, without postoperative nausea or vomiting, distention or any gas pain.

CASE IV.—Mrs. I. G., aged twenty-one, primipara. Her labor began at noon on April 15. Membranes ruptured at 4 o'clock and she was admitted to the ward late in the afternoon. The pelvis measured, interspinous, 23 cm., intercrystal, 25 cm., external conjugate, 16.5 cm., and the diagonal conjugate 10 cm. Cephalic presentation with the head movable above the brim. The operation was done at midnight under numerous disadvantages. When the abdomen was opened the stomach, somewhat dilated, appeared in the wound and before the uterus could be opened it was necessary to place a moist gauze pad within the cavity to keep back the viscera. In this case two and one-half minutes were taken in placing the temporary sutures.

This patient complained for several days of some pain low in the abdomen on the right side; there was considerable nausea during the first day and a half, but there was little, if any, distention.

In the last three of these cases the first row of muscle sutures was placed in the uterine incision before any of the temporary sutures were cut out.

I feared that this fixation of the uterus high in the abdomen, for a time, would interfere with its retraction and might lead to undue hemorrhage but, while I do think that the uterus does not thicken up quite so rapidly, I have not met any more bleeding than in many other cases and none that has required attention.

It will be my pleasure to continue to do the operation in this way until I have a series from which conclusions may properly be drawn.

1776 EAST AVENUE.

CONTRACTED PELVIS AND DIFFICULT LABOR.

BY

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I. *Cases with Small Pelvis.*—The frequency of contracted pelvis has always been one of the disputed questions in obstetrics. The most important cause for this lack in agreement is the misunderstanding as to what constitutes a "contracted pelvis" in a given case, and the various methods upon which statistics are based. Mauriceau stated that he met only two cases of contracted pelvis in his vast experience, but he must have considered only those with absolute contraction. Modern obstetricians place the percentage of contracted pelvis as high as 25 per cent. The figures vary for

different countries, both for the reason that the chief cause of contracted pelvis, rachitis, is less common in some countries than in others, and on account of the different standards upon which statistics are based. In this country, Williams considers a pelvis contracted when the external conjugate diameter is 17 cm. or below, not failing, however, to lay emphasis on the unreliability of external measurements alone. Litzman sets the limit of 10 cm. for true conjugate when the pelvis is generally contracted, and 9.5 cm. when the pelvis is simple flat. According to these standards such percentages as 14.9 (Litzman) and 24.3 (Leopold) can easily be accounted for. On the other hand, Fancourt Barnes in 1897 reported 0.5 per cent. contracted pelves among 38,065 cases in London. In this country there are various estimates given by different authorities. Davis (Philadelphia) reports 25 per cent., Williams (Baltimore) 13.1 per cent., while Reynolds (Boston) found only 1.3 per cent., the latter basing his computation on cases requiring operative interference.

We see then that a knowledge of these figures is not of much practical value, for what a physician is confronted with in his practice is the problem whether a given woman can deliver *her* child "*per viam naturalem*" without operative assistance if possible, with assistance if necessary, provided mother and offspring are not jeopardized. This question has become even more important of late since the extensive employment of abdominal section in obstetrics, for instances occur where women are held ready for an eventual Cesarean section when luckily the bag of waters, which has been preserved to insure an aseptic operation, ruptures under the influence of a pain and the head begins to mould through the pelvic inlet. And here lies the fallacy of the test of labor, for unless the membranes are ruptured and the head allowed to adapt itself to the pelvic cavity it can hardly be called a test of labor. Many cases are seen where a head will show little tendency to engage unless the bag of waters is ruptured.

It is not my purpose here to deal with the subject of absolute pelvic contraction, instances of which must be comparatively rare, judging from the fact that we have not met a woman with a true conjugate below 8 cm. among the last 3000 cases at the "Free Out-door Maternity Clinic." On the other hand, we have met cases which belong to the class of relative contraction and border line, if we consider the apparent size of the fetus. Few of these offered difficulty in delivery due directly to the contraction—2000 consecutive cases, constituting sixteen months of the clinic's work,

were selected. They all came under the writer's service. I selected as a starting-point those with an external conjugate of less than 17 cm., whether the internal diameters were thought to be normal or subnormal. There were forty-two women with external conjugates smaller than 17 cm. The other external diameters were all in proportion, except one woman who had an oblique pelvis due to an old tuberculosis of spine, hip and knee. Her internal measurements, however, were also estimated to be ample for a moderate size baby and she delivered herself of a 5-pound child, somewhat prematurely, although she had been warned that a Cesarean would of necessity have to be performed when she went into labor. This latter advice came from one of our large hospitals doing extensive maternity work.

Of the forty-two women having pelves which may be classed as generally but not excessively contracted and making up a percentage of 2.1, thirty-eight had normal labors, one of these being a breech while four required assistance. The indications for interference in these four, as may be seen on the chart (see Chart I), were not pelvic contraction but malpresentation. It may be contended that the latter was secondary to the former but this will hardly hold, except in the case with prolapsed foot, for of the others, one was a transverse case and premature, and the head would have in all probability engaged had it presented favorably at the inlet; and the case for which occiput posterior is given as the cause had had five normal labors previously. The fourth was a primipara and was delivered by low forceps. Only seven of the forty-two cases had estimated true conjugates of 9 cm. or less. One was 8.5 cm. and had forceps with both her former children. She was induced about three weeks before term and had an easy parturition. The remaining six had true conjugates around 9 cm., of these, one needed version for prolapsed foot and one for occiput—posterior. Two children were stillborn, of which one delivered by version for transverse presentation was premature, and the other was a breech with delay in extracting the after-coming head owing to an unyielding cervix.

Ludwig and Savor found that 75 per cent. of cases with a true conjugate of no less than 9.5 cm. terminate spontaneously; 50 per cent. with a true conjugate of no less than 8.5 cm.; and 25 per cent. of those with 8 cm. of our forty-two cases, twenty-four had true conjugates of 9.5 cm. and below; of these twenty-two delivered normally, a percentage of 91.

Here it may be appropriate to explain that we do not interfere

as a rule until the patient has been given sufficient time for cervical dilatation and ample time after rupture of the membranes to permit of molding of the head. A period of two hours after rupture of the bag of waters for multiparæ and four hours in primiparæ provided there are good pains, should be sufficient for engagement of the head. Failing this we resort to forceps. In the case of multiparæ with absent or insufficient pains, we resort to pituitrin in doses of 5 to 6 minims at intervals of thirty minutes, provided vaginal examination demonstrates that the uterine contractions result in molding of the head. We do not usually use pituitrin for unengaged heads in primiparæ, although in several instances it was tried with good results. If there is no engagement in spite of good pains we resort to forceps provided the head is fixed at the brim. Owing to the fact that all our work is performed in tenements, we make it a practice to allow more time for the test of labor than is customary in lying-in institutions.

In making up the tables, utmost importance was attached to the history of previous labors in the case of multiparæ, and to the history of the children. This was done to eliminate as much as possible errors due to personal factors, such as the basing of conclusions on measurements alone would entail. For the same reason the external conjugate was given predominance for we found that it is the diameter concerning which least errors are made, in view of the definite fixed points from which it is taken.

The sphere of the clinic's work comprises various nationalities and races, but of the forty-two with small pelves there were from:

United States.....	White.....	9
United States.....	Negroes.....	5
British West Indies.....	Negroes.....	3
Russia.....		15
Austria.....		5
Italy.....		2
Hungary.....		2
Turkey.....		1
Total.....		42

This proportion is practically the same as the ratio of distribution of all our cases among the various nationalities.

From the consideration then of the cases of the forty-two women with definitely small external measurements and moderately or relatively contracted internal measurements, there were no more who required operative interference than one would expect among women with normal pelves.

I. PREVIOUS HISTORY AND COURSE OF LABOR IN FORTY-TWO CASES OF CONTRACTED PELVIS.

Application No.	Initials	External conjugate	Previous full-term labors	Previous instrumental labors	Previous full-term stillbirth	Character of present labor	Weight of baby	Indications for instrumental delivery
		cm.					lb. oz.	
10,601	S. M.	15.0	0	0	0	Normal*	
10,130	F. L.	15.0	1	0	0	Normal	7	
10,607	L. V.	15.0	4	0	0	Normal	5	
10,376	I. H.	15.0	4	0	0	Normal	7	
10,057	T. M.	15.5	0	0	0	Normal	6 8	
9,925	M. N.	15.5	2	0	0	Precipitate	8 4	
10,240	E. H.	15.5	2	1	0	Normal	7 4	
10,076	C. W.	15.5	2	1	0	Normal	7 8	
10,819	S. G.	15.5	2	2	0	Induced, normal	6	
9,982	J. E.	16.5	0	0	0	Podalic version	6	Transverse (premature labor)
10,729	R. W.	16.5	0	0	0	Normal	8 8	
10,886	J. G.	16.5	0	0	0	Normal	6 8	
10,402	R. C.	16.5	0	0	0	Breech extraction†	7	
9,901	G. T.	16.5	0	0	0	Low forceps	6	Delay
10,384	M. Z.	16.5	0	0	0	Prolonged	7 8	
9,771	S. D.	16.5	0	0	0	Normal	7 8	
9,272	E. P.	16.5	0	0	0	Normal	7	
9,178	R. N.	16.5	0	0	0	Podalic version	7 6	Prolapsed foot in vertex presentation
9,495	C. M.	16.5	0	0	0	Normal	5	
9,321	L. M.	16.5	0	0	0	Prolonged	6	
9,780	R. M.	16.5	0	0	0	Normal	9	
9,784	S. K.	16.5	1	0	0	Precipitate	6 8	

I. PREVIOUS HISTORY AND COURSE OF LABOR IN FORTY-TWO CASES OF CONTRACTED PELVIS—Continued.

Application No.	Initials	External conjugate	Previous full-term labors	Previous instrumental labors	Previous full-term stillbirth	Character of present labor	Weight of baby	Indications for instrumental delivery
		cm.					lb. oz.	
0,500	L. J.	16.5	1	0	0	Normal	6 4	*
1,135	H. R.	16.5	1	1	0	Normal	.....
9,013	H. H.	16.5	1	0	0	Normal	7 2	*
9,344	L. S.	16.5	0	0	0	Normal	.....
9,308	N. P.	16.5	1	0	0	Normal	6 8	
10,498	Z. J.	16.5	2	0	0	Normal	6	*
8,752	O. S.	16.5	3	0	0	Normal	.....
10,674	L. D.	16.5	3	0	0	Normal	.....	*
9,106	M. P.	16.5	1	0	0	Normal	.....	*
9,240	B. D.	16.5	3	0	0	Normal	7 2	
9,168	A. F.	16.5	3	0	0	Normal	7 8	
10,362	F. L.	16.5	4	0	0	Normal	.....	*
8,824	S. G.	16.5	4	0	0	Normal	5 2	
9,218	L. B.	16.5	5	0	0	Podalic version	6 8	
9,202	D. A.	16.5	3	0	0	Normal	10	*
8,632	M. F.	16.5	3	3†	2	Normal	.....
10,705	G. N.	16.5	5	0	0	Normal	7 8	*
9,591	S. F.	16.5	5	1	0	Normal	.....
10,135	C. S.	16.5	6	0	0	Normal	7 12	
10,378	C. M.	16.5	7	0	0	Normal	7	

* Weight of baby not available.

† Baby stillborn.

‡ Woman had three miscarriages, one premature and two full-term former labors. None of previous children alive. Has positive Wassermann.

II. HIGH FORCEPS CASES.

Applica- tion No.	Initials	External conjugate	Previous full-term labors	Previous instru- mental labors	Previous full-term still- births	Weight of child	Cause of dystocia	Result	Remarks
		cm.				lb.			
0,047	J. N.	17.5	0	0	0	10	Relative contraction and left occip. pos.	Good	
0,000	S. S.	17.5	0	0	0	8.8	Relative contraction and right occip. pos.	Stillbirth	
8,852	N. J.	17.5	1	1	0	7	Insufficient pains and neurotic temp.	Good	Facial palsy hem-
9,054	A. S.	17.5	2	0	0	7	Left occip. posterior	Good	atoma of neck.
11,124	S. B.	18.0	2	1	0	8.4	Occip. transverse	Good	
10,856	M. R.	19.0	0	0	0	8.2	Right occip. posterior	Good	
8,758	S. G.	19.0	0	0	0	6-8	Right occip. posterior	Good	
10,609	Y. S.	19.0	0	0	0	7.8	Right occip. posterior	Good	
8,728	M. L.	19.0	2	1	0	6.8	Right occip. posterior	Good	
9,328	R. K.	19.0	2	0	1	10-4	Right occip. posterior	Good	
10,329	M. N.	19.0	3	0	0	7	Right occip. posterior	Good	
10,632	K. B.	19.0	2	0	0	8-8	Right occip. posterior	Good	
11,234	R. A.	19.0	6	1 version	0	7-2	Prolapsd hand in vertex pres.	Good	
10,172	E. N.	19.5	0	0	0	7-8	Not understood	Stillbirth	
8,975	L. D.	19.5	1	1	0	12	Relative contraction and insufficient pain	Good	
9,261	B. L.	19.5	4	1	0	7-8	Right occip. posterior	Good	
9,607	C. H.	19.5	6	0	0	7.8	Right occip. posterior	Good	
8,934	M. F.	20.0	0	0	0	7	Occipito-sacral	Good	Parietal hematoma
11,006	E. C.	20.0	0	0	0	8	Right occip. posterior	Good	
10,313	J. G.	20.0	0	0	0	7-8	Left occip. posterior	Good	
4,092	A. F.	20.0	0	0	0	9	Inertia uteri and rigid cervix	Stillbirth	Labor too prolonged
10,304	F. F.	20.0	0	0	0	9-4	Relative contraction	Good	
10,203	M. H.	20.0	0	0	0	8	Left occip. posterior	Stillbirth	
10,026	S. M.	20.0	2	0	0	8.8	Inefficient pains	Good	
10,955	E. M.	20.0	4	3*	2*	8.4	Inertia uteri and R. O. T.	.....
9,757	S. Z.	20.0	5	0	0	9	Right occip. posterior	Good	
9,400	S. F.	21.0	2	1	0	12	Right occip. transverse	Good	

* Craniotomy for first two—Cesarean section for third—Fourth labor normal—Fifth high forceps.

III. CASES TREATED BY INTERNAL PODALIC VERSION

Application No.	Initials	External conjugate	Previous full-term labors	Previous instrumental labors	Previous full-term stillbirths	Weight of baby	Indications for version	Remarks
		cm.				lb.		
10,032	M. C.	17.5	2	0	0	7	Premature placental separation	
9,066	P. P.	17.5	4	0	0	8-12	Shoulder	
10,509	E. G.	17.5	4	0	0	7-4	Brow	
9,256	E. L.	17.5	5	1	0	9-8	Prolapsed cord	
0,830	D. W.	18.0	4	0	0	8-8	Transverse	
10,921	S. O.	18.0	2	0	2	4	Transverse	
10,354	S. A.	19.0	2	0	0	8	Brow	
8,950	A. M.	19.0	3	0	0	8	R. O. P.	
9,834	S. G.	19.0	4	2	0	8	R. O. P.	
10,176	E. C.	19.0	5	0	0	7-10	Prolapsed cord	
9,677	P. P.	19.5	3	1	0	7-10	Shoulder	
9,074	S. J.	19.5	4	2	0	10	Inertia and rigid cervix	
0,595	L. D.	20.0	1	1	0	7-8	Shoulder	
10,303	M. B.	20.0	2	0	0	6-8	Shoulder	
9,102	A. B.	20.0	5	1	1	7	Inertia uteri	
10,668	M. C.	20.0	6	0	0	7-8	Shoulder	
9,269	M. R.	21.0	1	0	0	4-8	Inertia and rigid cervix	
9,670	M. S.	21.0	6	0	0	10	Prolapsed cord	
8,658	A. M.	21.0	6	1	0	8-12	Induced labor inertia	
10,991	R. C.	22.0	8	1	0	12	Prolapsed cord and shoulder	

Instrumental Cases.—(External conjugates above 17 cm.).—Let us now look at the question from the opposite angle.

Among 2000 consecutive cases, ninety-seven required assistance by forceps or version. These do not include such cases as breech, with or without forceps to after-coming head, forceps used for first twin, or version for second twin.

Of the ninety-seven instrumental deliveries, there were:

Low forceps.....	20
Mid-forceps.....	30
Versions.....	20
High forceps.....	27

These all had external conjugates of 17 cm. and upward.

The low and mid-forceps applications were done for various indications such as diminution in strength of pains, changes in fetal heart rate, resistance of pelvic floor in primiparæ, etc. Few if any of them, were associated with contracted pelvis and we shall not discuss them for this reason in detail. Suffice it to say that nearly one-half of them were performed on primiparæ to assist them in overcoming the resistance of the pelvic floor or for occiput posterior. The versions were done for definite indications, such as: prolapsed cord, shoulder, brow, transverse, thus:

Shoulder and hand presentation.....	5
Transverse.....	2
Prolapsed cord.....	3
Prolapsed arm and cord.....	1
Brow.....	2
Premature separation of placenta.....	1
Primary inertia and rigid cervix.....	4
Occiput posterior.....	2

While some of these complications might be ascribed to pelvic contraction, we shall not consider these cases in detail, since the versions were done for the complications. We did not do version for pelvic obstruction as such, except in two cases of occiput posterior where the head showed no tendency to become fixed. In the other cases, where there was any question as to selection between forceps and version, we chose the former, and only in one case were we compelled to resort to secondary version and that proved to be a brow presentation on introduction of the hand.

There remain now twenty-seven cases where forceps had to be employed. We call a forceps application "high" when the head is fixed at the brim, whether a wedge protrudes through the inlet

or not. When the head is wedged in the brim but the largest diameter is not quite, but almost, through we call it a mid-forceps.

Of the twenty-seven high forceps cases, there were twelve primiparæ and fifteen multiparæ. The total fetal mortality was 4 or 15 per cent. While the rate of mortality for the child in high forceps is given by some authorities as ranging from 15 to 40 per cent. we must grant that even 15 per cent. is quite high, in view of the fact that they could have been saved by Cesarean section.

I wish to call attention to the fact, however, that all four stillbirths occurred in primiparæ; that three of these primiparæ had normal external and internal conjugates and that the mortality in fifteen high forceps in multiparæ was nil. This seems to show that the difficulty lay materially if not largely in overcoming the resistance of the soft parts and that these women could, in all probability, deliver their subsequent children, provided there is a favorable presentation, whereas Cesarean section in a primipara leaves the pelvis in the same condition as before and subsequent children will have to be delivered in the same manner.

The following case is a concrete illustration:

A para-v had craniotomy performed for her first two children and Cesarean for the third. The fourth time she came under our care and delivered herself normally of an 8-pound child. The fifth time she returned again. This time the uterine contractions were very weak and after complete dilatation of the os and rupture of the membranes the head remained at the brim in the R. O. T. position, with the posterior parietal bone caught over the promontory. The external conjugate was 20 cm. and the true conjugate 9 cm. The child was apparently of good size. Had it not been for fear that the uterine cicatrix may give way, we would have used pituitrin. High forceps was, therefore, applied and the child extracted with ease. It weighed 8 pounds and 4 ounces. The third stage was complicated by hemorrhage due to a partially adherent placenta which had to be separated manually. This seems to prove that the difficulty with her former labors lay largely if not entirely with abnormality in presentation or anomalous expulsive force and not with the size of the pelvis.

There were four more cases whose true conjugate was relatively small. Two were 9 cm. and two 9.5 cm. Three were delivered by forceps and one by version for prolapsed cord, all these children being born alive.

Summary.—1. Of 2000 consecutive cases, only forty-two had external conjugates less than 17 cm.; of these forty-two only

seven had true conjugates less than 9 cm. They all had spontaneous labors except four, and these had complicated presentations.

2. The children born of these women were of moderate size corresponding to the slender build of the mothers.

3. There were ninety-seven cases out of a number of 2000 who required operative assistance, but only five had pelvis which can be classed as contracted, and the causes of dystocia were various, such as: occiput posterior, transverse, weak pains, prolapsed arms, brow, etc. The presence of contracted pelvis in some of these was only a coincidence.

Conclusions.—1. Small external measurements when they are all proportional with an external conjugate of 15 cm. or over, provided they are found in a woman whose slender build accounts for a small pelvis, deserve a fair test of labor. They usually have small children and will deliver spontaneously if the fetus presents favorably.

2. A fair test of labor in a doubtful case and especially in a primipara must include a period of four to six hours in active labor with the membranes ruptured, although as a rule, three hours will decide the outcome.

3. Cesarean section for relative contraction in a primipara, means repeated Cesarean for subsequent children, whereas extraction of the child through nature's passages, even if it should result in a stillbirth, will enable the woman to deliver her subsequent children *per viam naturalem* since a good deal of resistance, which is encountered in primiparæ, is due to the soft parts. In concluding, I feel bound to express my hearty thanks to Dr. I. L. Hill, whose kindness made this report possible.

216 EAST SEVENTY-SIXTH STREET.

CARCINOMA UTERI.*

BY

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(With ten illustrations.)

THE epithelium which forms carcinoma uteri is either a surface epithelium or else glandular. The surface epithelium is squamous in the portio and cylindric in the cervix and fundus.

The glands are cervical and corporeal, each well characterized, with

* From the Pathological Laboratory of the Woman's Hospital. Read before the American Gynecological Society, May, 1915.

high columnar epithelium in the cervix and low or cuboidal in the fundus. The location of the nucleus at the base of the cell is most characteristic for cervical glands.

The stroma of the cervix is dense connective tissue and smooth muscle tissue, while in the corpus there is a loose-meshed cytogen stroma. This difference in the stroma has a direct influence on the varying invasiveness of cervix and corpus carcinoma.

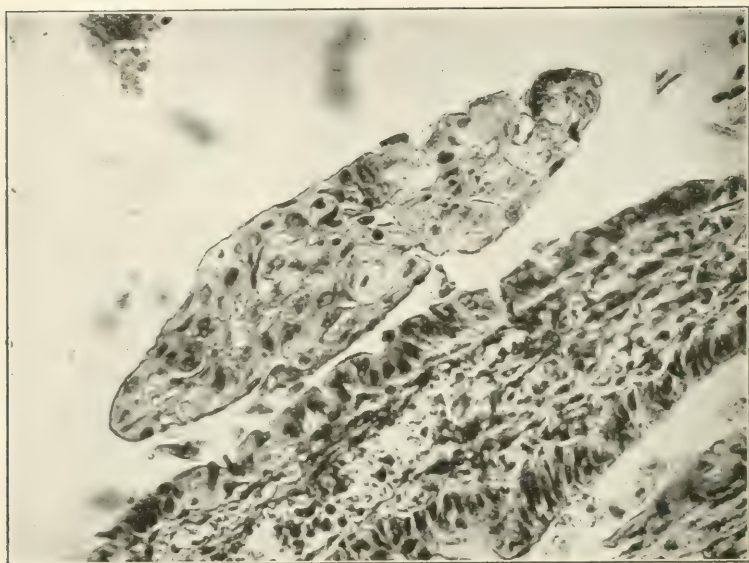


FIG. 1.—Squamous metaplasia.

The frequent changes which the endometrium undergoes in its cyclic development, the enormous increase in the size and length of the glands and the loosening of the stroma may well have an influence upon the development of carcinoma, but no direct relationship has appeared. The congenital and acquired erosion, eversion, laceration and its healing all are indirectly factors in carcinoma colli.

Carcinoma of the uterus has in former times been subdivided in terms of the situation. Such a classification is imperfect and of little utility, since the portio and cervix form carcinomata of similar appearance. Cornification may occur in either, even in those definitely arising from the cylindrical cells. There is no absolute proof of the origin of a carcinoma either solely from the portio or the cervix. Only the main site of the disease is to be taken as the criterion for

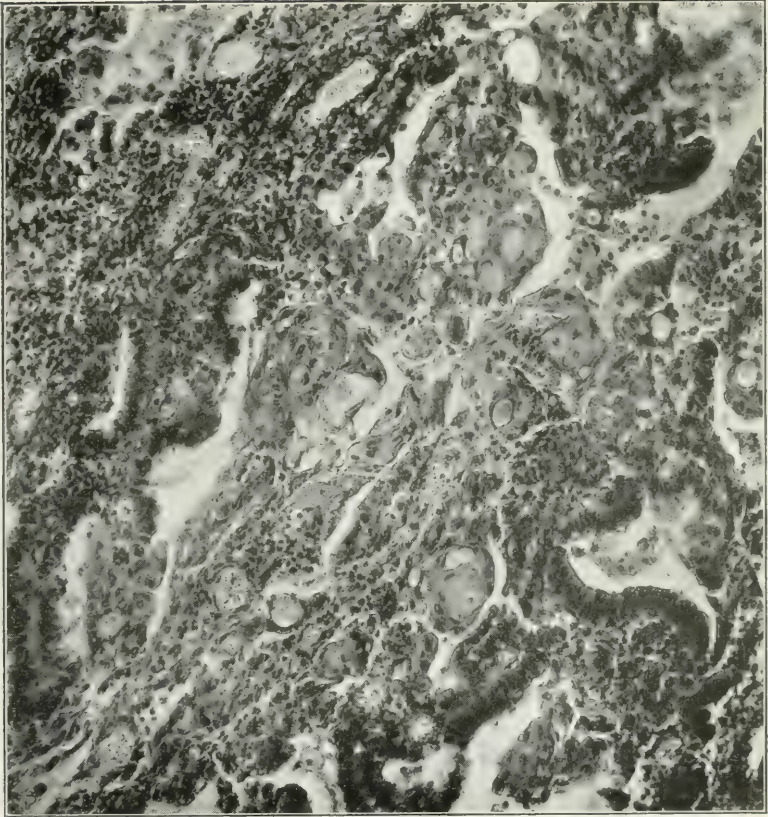


FIG. 2.—Metaplasia. Case 7132. Shows groups of squamous cells occurring in glandular carcinoma of fundus.

Squamous epithelium is protective. It occurs on exposed situations and has great capacity for regeneration. When a columnar epithelium is injured, an adjacent squamous epithelium will overgrow it. This is seen in healing erosions. The squamous characteristic is also latent in columnar cells and readily becomes dominant.

All disturbances of relationship, all chemical or mechanical disturbances have the tendency to call out this indirect metaplasia and it is always the protective and rapidly regenerating squamous cell which is produced. The normal squamous cell does not become metaplastic into any other type or cell; it may become undifferentiated, by process of anaplasia.

nomenclature. Almost half of all carcinoma colli grow into the corpus.

A second method of denomination has been that of morphology; namely, squamous, cylindrical and glandular, as proposed by Ribbert. This is also imperfect since through metaplasia squamous cells may occur in areas of normal cylindric cells either in the cervix or fundus. Also cornification may occur in abnormal sites. By metaplasia is meant not that a finished cell changes into one of

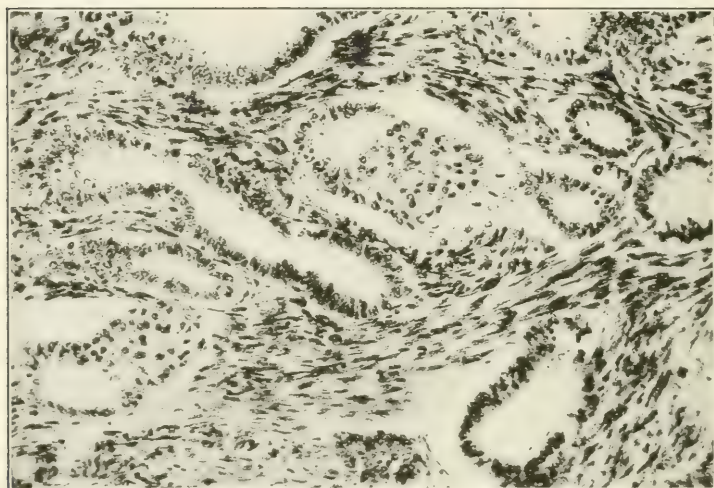


FIG. 3.—Case 8328. Shows another type of metaplasia in carcinoma of the uterus. This is in fact heteroplasia, the formation of two distinct types of epithelium from a single ancestral cell.

Note the sharp distinctions in the epithelium, no transitions of one form into the other. I have found two cases of this heteroplasia. No others have been reported.

another form, but that in the process of reproduction of cells the daughter cells of one type have developed characteristics of another type. Thus cylindrical cells may have descendents which lose the high columnar form and become broad, flat and even have the intercellular bridges characteristic of prickle cells. This is indirect metaplasia, and the occurrence of a direct transformation of a finished cell into a cell of a distinct type is denied.

The morphological basis of denomination of carcinoma uteri has the further fault that the term squamous implies an origin from the surface squamous cells while in reality carcinomata of the squamous

epithelium all arise from the lower layer basal cells of cylindric form. Thus in the same way the basal cell of the squamous layer might form a horn free cylinder cell carcinoma. Ribbert speaks of surface and glandular carcinomata, both composed of columnar cells.

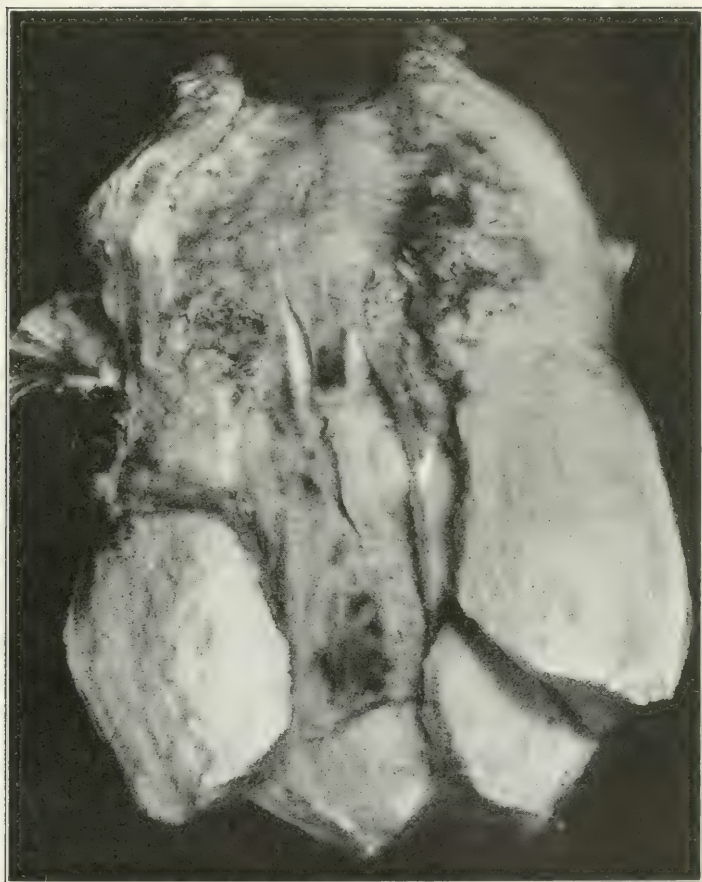


FIG. 4.—Case 9913. Carcinoma glandulare corporis uteri, occurring at the site of predilection at transition between cervix and corpus. Note the small area involved.

But it is impossible to determine the origin of solid masses of cylindrical cells whether from the surface or from glands. The only possible determination is whether the carcinoma appeared glandular or solid at the start.

Consequently one can denominate a carcinoma as carcinoma soli-

dum or glandulare or possibly glandulare secundarily solidum. This forms the only basis for nomenclature. As an adjective may be added the main site of the tumor, *e.g.*, carcinoma glandulare corporis or colli. Or another example carcinoma solidum colli. This nomenclature has a practical bearing because of the difference in prognosis of the different types. So much for denominations and forms.

Next, as to histogenesis, meaning the immediate condition giving rise to the carcinoma. There is, first, the erosion as site of origin and, second, the transition spot from one kind of epithelium to another.

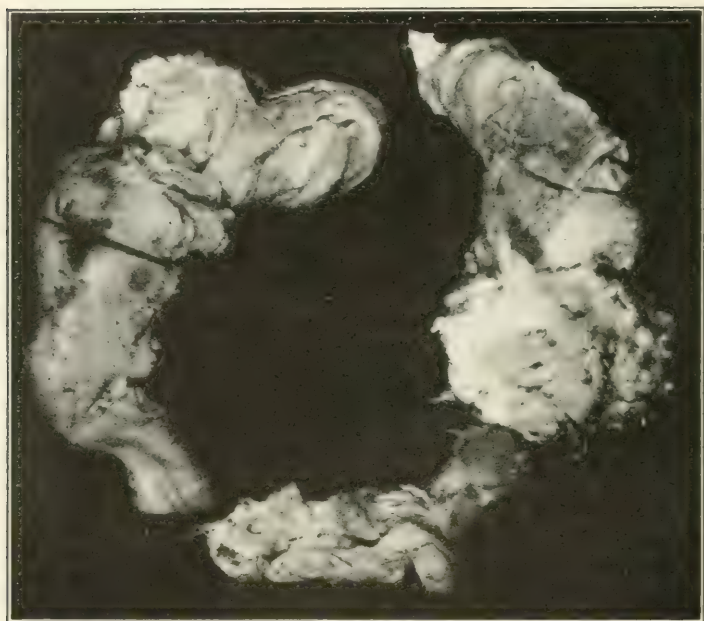


FIG. 5.—Case 9913. Metastases into both tubes of the same case. Larger than primary tumor.

That these two sites have some etiologic significance is not to be denied. However, there need be no such predilection site. Carcinoma may start as a solid nodule central in the cervix, while carcinoma of the uterine body has no known association with traumatism. Statistics show that most carcinomata occur in multiparæ, which speaks in favor of the theory that erosions and lacerations are a cause, but on the other hand the actual number of carcinomata in nulliparæ is fairly large, while the relative preponderance of multiparæ over nulliparæ having carcinomata at the meno-

pause may be no greater than the absolute preponderance of multiparæ over nulliparæ at that age. It has been asserted that trauma of childbirth and the changes following this trauma might cause a dislocation of epithelium with a secondary carcinomatous change.

According to Ribbert's idea it is not the effect of the trauma on the epithelium but rather on the connective tissue which causes the carcinoma. He holds that it is the changes in the connective tissue which make the epithelial growth possible. Some authors have

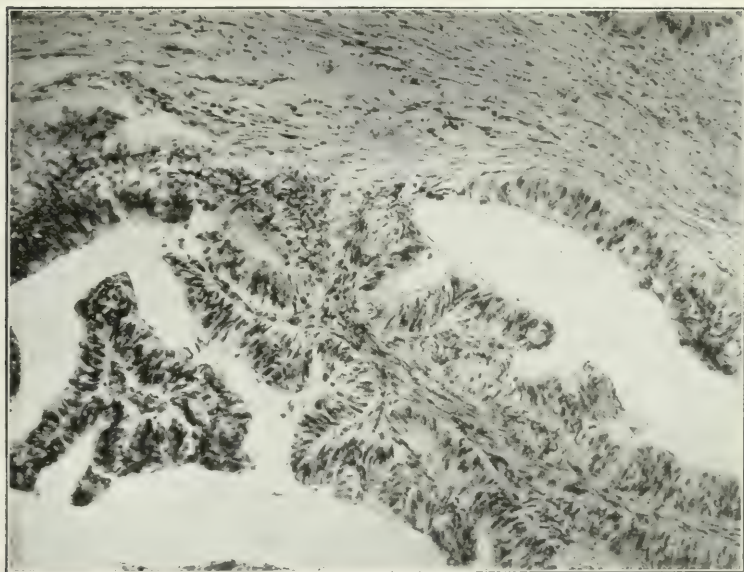


FIG. 6.—Case 9913. Simple glandular form of main tumor.

asserted that congenital erosions were the sites of cancer. In the few remarkable cases of carcinoma in childhood which have been reported there has been no proof that an erosion antedated the carcinoma.

Endometritis does not appear to be an etiological factor in carcinoma uteri. The condition itself is ill defined and no causal relationship has been proved. It has been suggested that in hyperplastic mucous membranes a loosening of the stroma, unlimited growth of the glands and multiplication of the cell layers suggests a beginning carcinoma. In fact the optical appearance of the very early stages of carcinoma are indistinguishable from those of hyperplasia. It has been stated that the lack of a basal membrane in such glands

might indicate malignant change, but normal glands may also reveal no basal membrane.

For all these reasons a histogenetic classification of carcinoma is impossible. Schottlander has differentiated carcinomata into those which proliferate on the surface and those which penetrate the tissues. The first are called exophytic and the second endophytic. This difference in growth depends upon the situation of a carcinoma. The

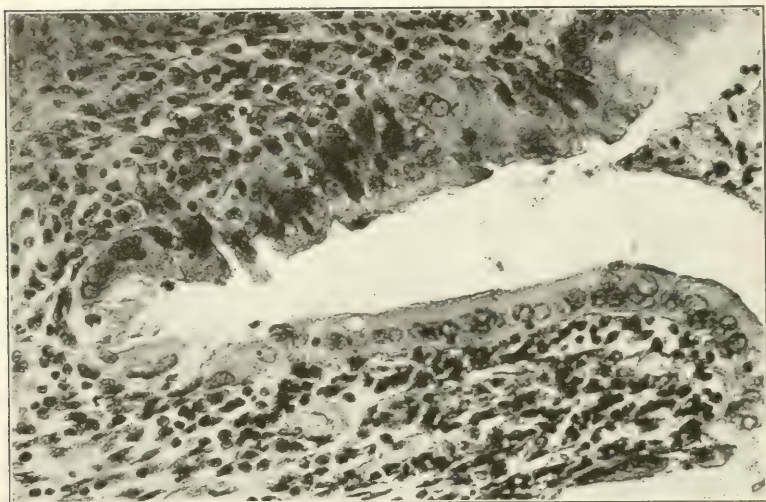


FIG. 7.—Case 9913. Appearance of appositional transformation of glands at edge of tumor. $\times 400$.

The case suggests a multicentric origin and that the tubal growths were *not* metastases.

There are three possible explanations, excluding direct extension which did not occur. First, lymph metastasis, which does not account for the fact that the tubal growth originated in the *mucosa*. This would be in retrograde direction. Second the wandering on the surface or just beneath the surface of carcinoma cells. This is also against the current, but is made plausible by cells in lumen of tube. Third, multicentric origin of tumor suggested by diffuse chronic inflammatory reaction throughout the entire genital mucosa. The bilateral tumors appear only as peculiar coincidences if they are lymph metastases while a multicentric origin supposes the repetition of favorable conditions.

fundus has a loose stroma which favors glandular penetration. In the cervix glandular carcinoma is hardly possible on account of the dense stroma. Here are formed solid carcinomata starting in small circumscribed areas and invading the parenchyma by the most accessible route, which is the lymph spaces. This leads to the characteristic plexiform arrangement of carcinoma of the cervix.

The formation of horn, whether in carcinomata of squamous or of cylindrical cells, is due to a biological peculiarity of the cells themselves. Horn forms in an alveolus as a result of a slow degenerative process; necrosis on the other hand is the result of a rapid process. Central necrosis is very characteristic of large alveoli of pure columnar cells.

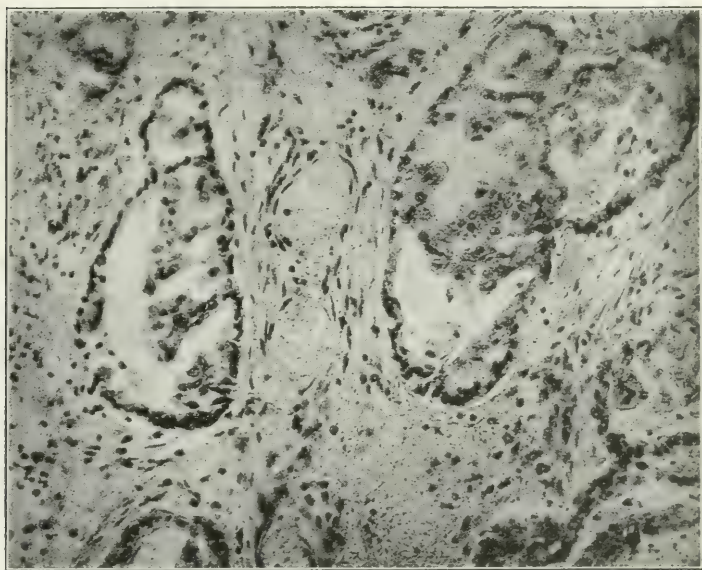


FIG. 8.—Case 9995. Carcinoma glandulare cervicis invertens, exophytic. Suggests a multicentric origin, since it is hard to imagine all the cervical glands connected by a surface layer of carcinoma continuous one to the other.

It has been customary to call a carcinoma which adheres to the glandular form an adenoma destruens and to speak of the secondarily solid one as adenocarcinoma.

Ribbert points out that this would lead to the idea that an adenoma destruens was not a carcinoma in the strict sense, while in reality it is a carcinoma from the start. Adenocarcinoma is a rather poor term because it suggests a combination of adenoma and carcinoma.

Carcinoma glandulare is the best designation for this type.

Benign adenomata of the uterus do not exist except in the form of adenoma polypusum. Glandular tumors not on the surface are carcinomata from the start. The nonexistence of true adenoma of the uterus is due to the fact that the uterus with its mucosa does not

form a true gland. The glands, as we have called them, are simple crypts comparable with the Lieberkuhn crypts of the intestinal mucosa where the term adenoma would not be a proper designation for simple benign glandular tumors. But in the true glandular structures of the body, such as kidney and ovary, benign epithelial growths do occur in the form of adenomata, papillomata and cystomata.

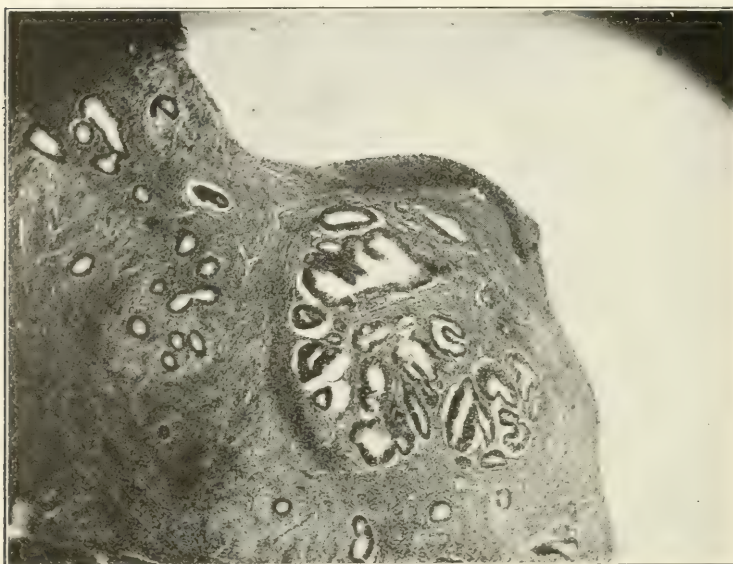


FIG. 9.—Case 10370.—Carcinoma glandulare corporis uteri, incipiens. Residual to cureting five days previous. Low magnification, showing how the curet might have removed all. Nothing visible to naked eye. No other spot found on sectioning entire mucosa.

Now in all these there are, characteristically, transitions between the benign and the malignant types. In the uterus as has been stated there is never any transition between malignant and benign tumors, but malignancy appears to be a quality fixed and invariable. The significance of this fact lies in its bearing upon the origin and growth of carcinoma.

The general teaching of the present is that tumors grow exclusively from their own cells, never by the conversion of the normal cells at the margin or elsewhere into tumor cells. This principle is generally known as the *aus sich heraus* law of Ribbert. It may be paraphrased as the cell-integrity principle.

Thus a tumor may be imagined to start from a single cell and to

grow solely by the descendents of that cell. The other view, which has few adherents at present, is that of appositional transformation. That is that the cells at the margin of the growth are converted into tumor cells. Visible changes which appear to indicate such a transformation are not accepted by the adherents of the cell-integrity principle as proof of the transformation. That such visible appearances occur is undeniable.

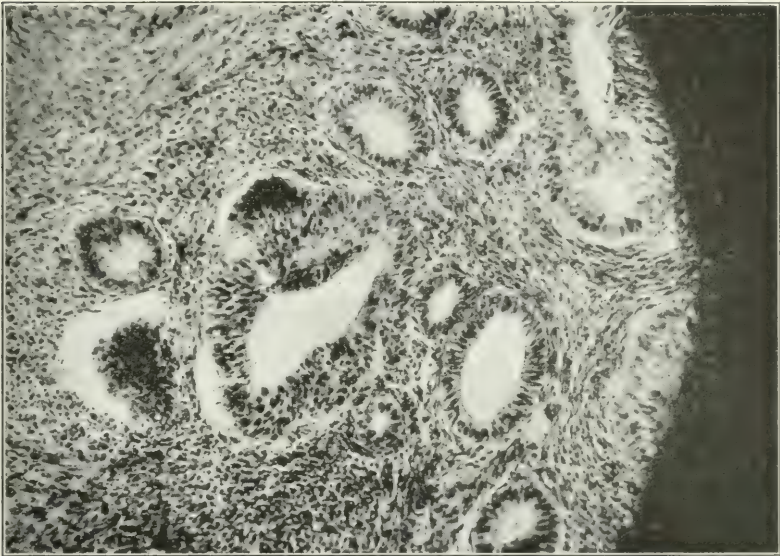


FIG. 10.—High power of mucosa of same case in a doubtful area. Without the outspoken carcinoma seen in the low power this area might be hyperplasia without malignancy.

The transformation of cells into tumor cells requires some explanation. It is not held that a finished cell of one type alters its character into a carcinoma cell but that under the influence of some irritant or stimulus cells divide and multiply and their descendents are atypical and show the character of optical unrest associated with malignancy. In this sense appositional transformation may still be held to occur.

In early carcinomata the optical appearances are absolutely indistinguishable from other pathological processes. This can hardly be insisted on too strongly. These appearances are a loosening of the stroma, unlimited growth of the glands and multiplication of the cell layers. All this may occur in simple hyperplastic mucous membranes. It has been stated that the lack of a basal membrane in

such glands might indicate malignant change, but normal glands may also reveal no basal membrane. The idea that a cell is either a carcinoma or not a carcinoma and that the distinction can be recognized visibly must be given up. In fact the very way in which carcinomata do arise is that of nonspecific hyperplasia. It is only a matter of degree when the carcinomata can be recognized. We have the established influence of chronic inflammation in the causation of carcinoma as the sole etiological factor known at present.

We do not know that visible changes are either the primary changes or the essential ones in the formation of cancer. If there is such a thing as the conversion of a normal cell into a carcinoma at all then the cell-integrity principle vanishes. The absence of transition forms between malignancy and nonmalignancy as noted in the uterus is consistent with this conception. But the occurrence of what optically appears to be transitions in other glands remains to be explained on this basis.

The explanation usually given is that these are not transitions but are juxtapositions of two different tumors. This implies a simultaneous origin of the tumors if the carcinoma is held to be distinct from the benign tumor. Histologically the carcinoma often appears much the more recent of the two.

The fact that transitions do not occur in the uterus is no proof of the correctness of the principle, since transitions cannot be expected there. Where apparent transitions do occur doubt is thrown on the principle. The visible change may be a secondary effect, not the real fundamental expression of carcinoma. We do not know that any visible change necessarily marks the occurrence of carcinoma, perhaps a cell or a gland is carcinomatous even before there is any visible change. In an early carcinoma it is impossible to say where the limits are, what is carcinoma and what not. If it were not for the undoubted carcinoma in one locality the remainder would pass as normal. However, it is really carcinoma as is shown by the development of similar areas into true carcinoma.

Thus it is possible that some carcinomata may have a multicentric origin instead of arising from one single cell or a group of associated cells. This would give an explanation for some multiple tumors which are hard to explain on the basis of metastases.

The relative frequency of carcinoma of the collum and body of the uterus has been variously stated. Winter gives a proportion of seven to one and Steinbach of eight or nine to one. This takes into account all cases which were examined whether operable or not. In looking over the figures of the operated cases at the Woman's

Hospital in the last three years it was somewhat surprising to find eighty-six cases of cervical carcinoma as against forty-six of the body, roughly, two to one. This has no broad significance, for the operability of corpus is far greater than collum carcinoma. However, the proportions found in this laboratory suggest certain things. It may be that in examined cases some carcinomata of the body are overlooked on account of their lesser accessibility to the eye. Then also accidental microscopic discoveries of corpus carcinomata are more frequent than collum carcinomata. It may be that the corpus carcinoma will appear to have an increasing prevalence in the future when curetings are more systematically examined.

Metastases.—Carcinoma colli most frequently forms metastases along the lymph vessels. These being situated in the neighborhood of uterine vessels the metastases generally follow that path into the parametrium. The next structure they find in parametrium is the ureter. In reality the ureter and bladder metastases form the most frequent complications of carcinoma colli. The glands in the hypogastric triangle are the next affected and along the internal iliac and common iliac is another series of glands. Whether the bladder is affected by contiguity is not always easy to decide since the bladder has the same muscular arrangement as the uterus.

Metastases are frequently submucous and in the muscularis around the vagina so that an intact mucosa does not signify freedom from involvement. In the Percy operation one cannot infer as to the extent of the disease from the appearance of the mucosa. Schottlander pointed out that the external appearance was no criterion for the extent of involvement, that the macroscopic and the microscopic pictures do not coincide. The pure glandular forms are much less sharply contoured than the solid forms. The larger the alveoli, the more the necrosis and the more distinct the tumor. But the more or less distinct macroscopic limitations have no bearing on the lymphatic propagation.

Metastases in corpus carcinoma follow the natural channel of lymph, by the mesosalpinx and mesovarium. For this reason metastases in the ovary are not infrequent though they are very rare in collum carcinoma. The latter would imply retrograde metastases, which Ribbert holds do not occur. Of this there is no proof. Metastases are by the lymphatics, in which case they are plexiform, or by apposition, in which case they are superficial. Distant metastases are rare in corpus carcinoma. The myometrium presents an obstacle and makes slow growth. Also the restriction to glandular form makes for slow growth.

Combinations of corpus and collum carcinoma have been described. Metastases of the collum into the corpus are not infrequent.

Carcinoma metastatic from any other organ into the uterus is very rare. But direct invasion of tubal or ovarian carcinoma into the uterus has frequently been described.

The pathological diagnosis of carcinoma is from excisions, curetings or the specimen itself. In some cases cureting has apparently removed the entire carcinoma (Ladinski). This is at the most only a remarkable circumstance, never to be counted upon in the light of a cure. It may be stated without fear of contradiction that the most thorough cureting cannot remove all trace of glands. Hence one can never be sure that the entire neoplasm has been removed. A wedge-shaped excision including normal tissue is to be preferred for a diagnostic specimen in suspicion of carcinoma colli. A frozen section is not desirable in collum carcinoma since a suitable piece may be removed without anesthesia a few days prior to the operation, allowing careful embedding. No likelihood of implantation metastasis will result in the few days intervening. The objections to frozen section at operation in suspected collum carcinoma are those of frozen sections in general. In the case of curetings from the corpus frozen section should never be attempted. The tissue is too frail for manipulation.

The prognosis of carcinoma uteri depends not so much on the character of the cells as on the channel of propagation. The squamous and the cylinder cell are approximately alike in malignancy. The prognosis is influenced by the condition of glandular or solid form, the latter being more easily invasive.

WOMAN'S HOSPITAL.

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA

Meeting of Thursday, April 1, 1915.

The President, DANIEL LONGAKER, M. D., in the Chair.

*Joint Meeting with the New York Obstetrical Society, held at the Hotel
Rittenhouse, Philadelphia.*

The paper of the evening was read by DR. ROBERT L. DICKINSON,
New York.

THE NEED OF INSTRUCTORS AND INSPECTORS AS HOSPITAL OFFICERS.*

DISCUSSION.

DR. J. M. BALDY.—Little did I think when I first heard Dr. Dickinson discuss this subject of hospital efficiency that I would eventually get into the fight side by side with him. Little did I think when I first became interested in medical educational matters that it would of necessity lead to an interest in hospital management, and yet this is exactly what has occurred.

When we read the word "approval" into the 1913 amendments of the Medical Act, we entered upon difficulties at that time undreamed of. "Approved" has come to mean an oversight of hospital efficiency and reorganization, not only in the state but in the nation. I say in the nation because we have applicants from as far as California for approval in this state, for internship. There is probably not a state in the Union from which we have not had such applicants. This is a field which we hardly realized we were opening up, but since it has practically been thrust upon us and since we find ourselves facing the legitimate conclusions of the adoption of an interne year in Pennsylvania we mean to carry it through and carry it through effectively.

At Chicago in February the Federation of State Boards passed a resolution that it was the opinion of the Federation that every State in the union should follow Pennsylvania in this matter. The next step will be that the Federation will make this a prerequisite to membership. The eyes of the whole country are on Pennsylvania and it will not do to have it said that we have undertaken what we cannot do effectively.

We all know that the hospitals of this country are not effectively organized, and the question arises, is it the fault of the medical men or of the governing bodies of these institutions? The fact remains wherever the fault, that hospital efficiency in this country is to a large

* For original article see page 385.

extent a disgrace from a scientific viewpoint, and Pennsylvania is no exception, although we are probably better off in Pennsylvania than are any of our neighboring States because of the fact that the state has offered in the past such generous aid to medical institutions. In spite of this of the approximate 225 hospitals in this state, the Bureau of Medical Education and Licensure have been able to approve only 100 for internship, and it remains with these to show whether or not they will be approved at the end of another year. It is not improbable that at least 25 of them will drop by the way.

We medical men have grown up in an exceedingly narrow field of thought. We have resented interference from the outside. We have failed to bring the proper pressure to bear from our own ranks upon hospital managers. We have failed to impress these men who are laymen and who are not expected to know the scientific side of the question with the importance of certain features of hospital management. We might as well face the truth now as at any other time and wipe out the reproach of the past before we are driven from other sources to do so. We have been too much inclined to look upon hospitals as our own private property and to move along complacently in the lines of least resistance, and where it was difficult on account of the lack of funds or on account of the lack of responsiveness on the part of hospital managers to bring about results which we knew to be proper, we lay down on the job and allowed things to run along in the easiest way, and if the matter has come home to us now, we well deserve what we get. If we do not correct it, it will be but a short time until the laity do, and our indifference and lack of action will eventually result in our losing the state appropriations for our institutions. A Board of Directors properly instructed and properly supported by its medical men, will usually do what is right.

I want to ask you this question. What right has any medical institution to exist without a well-organized clinical and pathological department? It is a fundamental fact that it has no right to so exist, and without this equipment properly officered it is in no sense of the word a true hospital, and the patients in that hospital cannot be given the advantages which modern medicine is able to give, and the medical men connected with such an institution, however well they may have begun with the fund of proper knowledge, will soon degenerate into the old prescription writing doctor; and what is the good of all the advances made in modern, scientific medicine if this is to be the result? The simple truth is that we ought to be ashamed of ourselves. I am putting this rather strongly but that is exactly what you expect of me and if I did not do it you would be disappointed.

In regard to anesthetics, what right have any of us to turn the life of a patient over to the mercy of an interne when that patient has intrusted his life to us? And how can we answer to the Board of Managers or to the community if the health of these individuals be injured or their lives lost? The usual system of the young interne in the hospital giving the anesthetic is an abomination and should no longer be tolerated. If the laity knew and realized what this sort

of thing meant to them by way of accidents in hospital practice, they would have risen up long since and demanded a reform.

The Medical Act requires an internship after graduation by the student before that student can enter the examination, which internship must be in an approved hospital. The Bureau of Medical Education and Licensure will not approve a hospital which has not properly organized departments such as are specified in the act, namely, fully equipped clinical and pathological departments administered by a doctor well equipped in the knowledge of laboratory technic, and anesthetic department in the hands of an expert anesthetic who is available at all times, to be present and instruct internes while they are administering the anesthetic. There should be an obstetrical department, or an affiliation with some other institution that has an obstetrical department where he can get the instruction before he goes out to actual practice and ruin the health of the mothers of the country.

There is one other point which is not mentioned in the act which is of necessity of first importance in efficiency, and that is the character of the men on the medical and surgical staff. We all know what influences too often dominate the appointment of these men. We all know how utterly incompetent certain ones of them are. We all know that one of the greatest reforms should come in this direction. This is a matter largely up to the Boards of Managers, but it is one which it behooves them to consider very carefully in the future if they wish approval. We are not going to send internes into an institution to be taught by men who themselves need teaching, in many instances even worse than the internes. The Bureau has only been able to approve in the neighborhood of 100 of the hospitals of the state, and this out of a total of some 225. Even in this list there are at least twenty-five of which it is questionable whether or not we should even have admitted them tentatively, but we have acted largely in the line of leniency and have given every institution we could with any conscience whatever, a chance to make good.

Of course, such institutions as the Pennsylvania Hospital, the Episcopal Hospital, the Presbyterian Hospital, the German Hospital, and others of a like group, need only to make a few minor changes in order to meet full approval. There are others which need complete reorganization from top to bottom, and these are the two extremes.

Fortunately, we have a Governor in this State who is a man of education and a man of wide experience who appreciates the situation and whose sympathies are entirely in the line of a reformation.

In discussing these matters with various hospitals we have met not infrequently with this statement, namely, "Why what you ask will require that we pay somebody to head the anesthetic department and to head the laboratories." Our answer had been: Why not? You pay your engineer, you pay your cook and you pay your superintendent, and you would not dream of opening your institution without these people. You would be surprised if anybody proposed

to you that you conduct a house without filling these departments. From the scientific standpoint of efficiency and service to the community, you have no more right to ignore your anesthetic department and your laboratory department than you have your culinary department. These positions should be considered absolutely essential to the organization of any hospital and the taking into consideration of the pay-roll for the filling of these positions should be considered of prime importance and to be first provided for.

The difficulty, gentlemen, is this. That these departments are filled by medical men and the laity has been disinclined from time immemorial to pay medical men for public service. I take it that this is our own fault. If we fall down on efficiency how can we expect but that the laity will measure us as we have measured ourselves?

DR. R. C. NORRIS.—Why I have been asked to participate in this discussion passes my understanding. I have not the experience which Dr. Baldy, in his Billy-Sunday-like manner has presented to us, but I have no doubt that our friends from New York who have listened to his earnest talk will "hit the trail" back to New York and establish some such methods in their own city. We are setting standards in this State that every doctor will appreciate. The time has come when the medical profession must fall in line with the wave of efficiency that has struck the world. I take it that there are inherent differences between the management of individual hospitals and the management of a large corporation, a topic referred to by Dr. Dickinson. Dr. Baldy has struck the keynote of the difficulty in his reference to the large number of independently managed hospitals in our community. You who have come from New York know how you have gone all over town and found that each clinic you have visited represented an institution managed independently. The interne is in the hospital to learn—some expect knowledge from mere residence, others from hard work—and he will not care much for marks. There are inherent difficulties in applying hard and fast rules as suggested by Dr. Dickinson. There is danger of trying to be so efficient that we may fail to be practical. I cannot see how rigid marking will help the staff of a large hospital. The efficiency of the various groups of men on the staff of an individual hospital will not be always the same; one man may be more efficient as a teacher; another, as a surgeon. It is impossible to set a standard and say that each man on that staff shall reach that particular standard of efficiency. There must be merit given where merit is due. There must be effort made to help a man succeed in his chosen field and in which he is most capable. The multiplicity of hospitals is the first difficulty that menaces us. The most efficient nation in the world is Germany. The Germans, as we know, are most efficient in their hospital management because they are concentrated. There is a central governing body, a small number of institutions where rules and regulations can be carried out. As has been stated by Dr. Baldy the greatest good can be done by the institutions of this city by a closer union between the medical staff of a hospital and its management. Some of our hospitals are getting together in this way. We have selected

men from our staffs as executive committees to meet a small committee of the boards of directors. Too often it is expected that the machinery of the medical and surgical staff will go on without increase of facilities. Expense means discontent to managers always. To keep the various departments of a hospital up to date means expense. The standard of efficiency for most managers is one of money returns—income from private patients especially. Hospitals are charity aids primarily, and all efforts at efficiency should radiate from that central purpose. Each hospital must establish its own efficiency bureau, and often cannot be influenced by systems that may help another institution. The instruction and inspection plan of Dr. Dickinson will always be valuable, its worth depending upon the knowledge, wisdom and practical qualities of those who do the instructing and inspecting.

DR. EDWARD A. SCHUMANN.—The question of standardization of hospitals and especially of surgical procedures is open to many grave objections. I have had the pleasure of discussing his theories and experiments with the late Frederick Taylor, the father of scientific management. His early experiments showed that workers with pig iron did not know how to handle pig iron; that brick-layers did not know how to lay bricks, and that the efficiency of these artisans was increased from 40 to 80 per cent. in a day by the use of better methods. It is imperative that we do not confuse the artist with the artisan. There is no form of human activity in which individualization is more important than in the practice of surgery. I believe it to be a fair statement that no ideal surgical procedure of any kind has as yet been devised, and it follows therefore that no standardization should be attempted, at least not in the present, still formative state of the art.

Now as to the standardization of hospitals: Here again we have no standard, the question as to the kind and form of building, what units, how arranged, are still in debate and no definite conclusions have been reached. It is my view that individual methods should be encouraged in all branches of medicine and surgery, until such time as the profession is agreed upon the efficacy of any given procedure, when that may be regarded as standard.

DR. JOSEPH BRETTEAUER.—I enjoyed Dr. Dickinson's paper and Dr. Baldy's free discussion of it and I fully agree with his remarks. I should like, however, to state my belief that we shall never have the standardization which Dr. Dickinson looks for so long as we have boards of trustees who have to beg for the money to support the hospitals. I believe that so long as we have small hospitals in great numbers, with large boards of trustees, we cannot fulfil the conditions demanded by the Bureau of Medical Education and Licensure of Pennsylvania. I think that the only relief will be the State or even municipal control of all hospitals. When we compare our institutions with those of Europe, the difference is obvious. You will readily see why they are more efficient than ours.

I do not agree with Dr. Dickinson when he groups the medical

profession with business corporations. There are other standards in our profession besides business standards.

DR. ALLEN, of the United States Navy.—Efficiency is like fire, a very valuable servant, but a very bad master. It is a much abused word. We cannot measure by rule or line, but must take into consideration common sense, judgment, character and ability. Promotion for merit will advance right men and do away with poor ones. We must credit, as has been said, qualities of leadership, of teaching, of technical skill. It is often thought that to standardize any procedure there must be no departure from a fixed rule. To standardize means rather to have the best procedure up to date. We must study all conditions and standardize a hospital for a particular place. It is our business to instruct our trustees in the fundamental things of hospital standardization.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Stated Meeting, May 11, 1915.

The President, DR. JOSEPH BRETTAUER, in the Chair.

DR. H. D. FURNISS reported

TWO CASES OF SUPPURATIVE PYELONEPHRITIS FOLLOWING POST-OPERATIVE UTEROVAGINAL FISTULA.

CASE 1.—E. R. This patient was operated upon ten weeks before I saw her for a large uterine fibroid. Eight days following the operation she noticed a discharge of urine into the vagina. Previous to this she experienced some pain in the right lumbar region and had run a temperature. The amount of urine discharged into the vagina seemed to be equal to that voided from the bladder. She voided normally two or three times a day and did not have to get up at night. Examination of the bladder shows a perfectly normal bladder. After injection of indigo-carmin the blue stain was seen coming from the left ureter but none at all from the right. A catheter passed into the right ureter met obstruction $1\frac{1}{2}$ inches up. After fifteen minutes a blue stain was noticed coming from the vagina. Placing the patient in the knee-chest position, filling the vagina with pledgets of cotton and removing these after a few minutes, the location of the fistula was determined. This was high up in the vaginal vault on the right side. The amount of blue color in the urine from the vagina was very much less than that in the urine as seen coming into the bladder. On account of this marked diminution of indigo-carmin excreted and the amount of pus that was in the urine, the kidney was removed rather than an attempt being made to do a ureterovesical anastomosis. The ureter was much dilated as was also the kidney pelvis. The kidney showed

marked suppurative pyelonephritis. The lesson taught by this case is that soon, in eight or ten weeks after operation, marked functional kidney disturbance can occur. It teaches us that if we are going to do a ureterovesical anastomosis and save the kidney it should be done as soon as possible.

CASE 2.—Mrs. S. N., sixty-five years old. In December, 1907, had an abdominal panhysterectomy for carcinoma of the uterus. Several days after this she developed a ureterovaginal fistula, and was then seen for the first time. Cystoscopic examination showed a discharge of urine from the right kidney into the bladder, but not from the left. A catheter could be easily passed into the right ureter but only $\frac{3}{4}$ inch into the left. She refused at this time to have any operative work done, and not until August, 1908, did she consent. Then I did a plastic operation through the vagina, anastomosing the fistulous opening into the bladder. This was successful in that there was no further discharge of urine into the vagina. She was relieved and was all right until January, 1911, when she came to me complaining of bladder discomfort. The urine showed a large amount of pus, and upon cystoscopy the opening on the left side was seen to be about the size of a match stick and from it was a constant discharge of pus. On March 25, 1911, I removed the left kidney. It was about one-third the normal size; the pelves and both ureters were markedly dilated and the kidney cortex was about $\frac{3}{16}$ inch in diameter. Patient made an uninterrupted recovery. The end of the fistulous tract was really inserted into the bladder, not the ureter into the bladder. What should have been done was to anastomose the ureter into the bladder by the abdominal route and as soon as possible after the occurrence of the injury. When the patient was seen at the end of the year and the first operation done, it would have been better not to do this operation but to remove the kidney, as it was already functionally inactive.

DR. DOUGAL BISSEL.—“I differ with Dr. Furniss in regard to his conclusions in the first case. He seemed to think that the desirable step would have been to remove the kidney. I believe if he had gone into the abdomen and sought for the ureter and anastomosed it to the bladder, he would have had a satisfactory result. My experience in several of those cases has made me conclude that the transperitoneal route is the best. The particular case I have in mind, which possibly some of you may remember, was one where the ureter became anastomosed to the uterus itself and emptied into the uterine cavity at about the junction of the cervix and body. In that case I opened the abdomen (several attempts had been made previously by way of the vagina) and got the ureter at the border of the uterus and anastomosed it into the bladder and saved the kidney. The patient has been functioning ever since in perfect comfort and health.”

DR. R. T. FRANK.—“I agree perfectly with Dr. Furniss about the first case, that it should not have been done from below. The one point I feel should be emphasized is the lesson taught by the second

case, that in ten weeks this marked change in the ureter had already taken place. This we all ought to take to heart and judging from this case the best time to reoperate would be as soon as the patient has fully recovered from the primary operation and is up and about, which would be approximately ten or twelve weeks."

DR. H. N. VINEBERG.—"I take exception to the last statement because I think a good many of these cases will heal of themselves and I think there are a good many of these ureteral fistulæ where the lesion is probably only in the wall laterally. These cases will heal without any trouble, and I think it would be subjecting a lot of women to unnecessary operations if one operated on them three or four weeks after the injury occurred.

"It has been my misfortune to see a few of these cases and I feel, as I said before, that if the fistula does not show itself for ten or twelve days after the operation then those cases, as a rule, very frequently heal of their own accord."

DR. H. D. FURNISS.—"I think in those cases showing up ten or twelve days after operation, the ligatures have cut through and necrosis has taken place. There was no evidence that this was a lateral injury unless it was a lateral injury with a very big opening, because there was no escape of urine into the bladder at all. I have had one case of lateral injury where as much came through the vagina as through the bladder. It was because the functional tests on this kidney were very low and the presence of infection that I decided to remove the kidney. I did one anastomosis into the bladder and I lost my patient from peritonitis. I think there is a good deal of risk in all these cases in anastomosing the ureter into the bladder and I think that in a great many of them the risk to the patient is a good deal less in removing the kidney after it has been damaged."

In a symposium on

RÖNTGEN-RAY TREATMENT OF UTERINE FIBROIDS.

DR. SAMUEL STERN, read by invitation a paper on

X-RAY TREATMENT OF UTERINE FIBROIDS.*

and DR. ROBERT T. FRANK, a paper on

THE CHOICE BETWEEN OPERATION AND RÖNTGENIZATION OF UTERINE FIBROIDS.†

DR. H. J. BOLDT.—"I must say that the address given us by Dr. Frank strikes me as the most practical one that we have heard on the subject, and his viewpoint is well illustrated by a case which occurred in my own experience last week, a woman some forty odd years old, in whom I would have defied anyone to make a diagnosis other than that of myofibroma. While there was objection on the part of the

* For original article see page 396.

† For original article see page 408.

patient and on the part of her physician to have an operation done until other methods had been tried, I declined to do so for the reason that I thought there was a possibility, in fact, I thought it was probable that there might be a malignant change. When the abdomen was opened it was found that we were fully justified. The tumor apparently was a myoma the size of a small child's head, but on the anterior surface there were two suspicious areas which proved to be carcinomatous later, and on opening the uterus subsequently it was shown that it was well-advanced and well-marked adenocarcinoma. The disease had advanced so far that the glands on the left side had become quite extensively involved. There was an instance again, in addition to one I previously reported to this Society, probably a year or two ago, which showed me that we must take to heart the words spoken by Dr. Frank—when there is the slightest suspicion we should abstain from *x-ray* treatment. In those cases where it is suspicious we may make a diagnosis by previous curetting and having the scrapings examined, but there are so many of those cases that, personally, I prefer, in view of the low mortality, to take my chances with operative treatment. There is no doubt but that Röntgen therapy in properly selected cases is ideal; and for those persons who do not mind the time element nor the expense and are in position to have the treatment, to my mind, if the condition is suitable, it is undoubtedly the treatment to be followed."

DR. J. R. GOFFE.—"Verbal reports of the work at Mount Sinai Hospital have been circulating about very freely for the past months and I came here prepared to be convinced by this official report that the *x-ray* therapy was the treatment *par excellence*, but, from the papers that we have heard, I am not convinced in any particular regarding it. We find that the *x-ray* treatment is limited to an extremely small number of cases. They must be absolutely free from complications. At the present time we have an excellent treatment for fibroid tumors by operative procedure. We are here to-night, as I take it, to compare the two treatments. We hear from the analysis of the cases operated upon by Dr. Brettauer, when we come to narrow it down to simple, uncomplicated cases, that his percentage of cures comes pretty nearly to 100 per cent., the same as the *x-ray* does in the very carefully selected uncomplicated cases. Let us take, then, that class of cases in which the *x-ray* is applicable. I should say that considering the discomfort, the risk run by the use of the *x-ray* from burns and from the treatment in general a woman is wise who selects the operative procedure in preference to the *x-ray*. With the supravaginal hysterectomy we have a procedure in which the tissues are disposed of as nicely as in any plastic operation, the parts are restored to their normal relations in the pelvis, all the organs perform their functions afterward as perfectly as before and I cannot see but that the woman is in quite as good a condition after a supravaginal hysterectomy as after the *x-ray*.

"One extreme case is reported of a woman becoming pregnant after *x-ray* treatment. Any number of cases are on record that have been subjected to operative procedures for fibroid uterus and have after-

ward become pregnant. Of course the uterus has not been removed but we have done myomectomies and I doubt not that every one here who has had any series of cases of fibroid tumors has had a number of cases that have been subjected to myomectomies and have afterward become pregnant and borne children. So that, from every viewpoint, it seems to me that the operative procedure is the one to be preferred to the x-ray. It is quick, the results are identical, the danger is almost nil, and in uncomplicated cases there is 100 per cent. of recoveries. I have a patient now upon whom I operated last Saturday, removing three fibroid tumors, one as large as a cocoanut, doing a supravaginal hysterectomy. As I passed her bed to-day she said to me, 'The house surgeon won't let me get up; I would like to get out of bed.' Convalescence is smooth, uncomplicated, as a rule, and, as I have said, in my judgment, the woman is wise who selects the operative procedure in preference to the x-ray."

DR. H. N. VINEBERG.—"I have been interested in the papers of Dr. Stern and Dr. Frank and the one thing that has struck me to the disadvantage of the x-ray is the uncertainty of diagnosis of abdominal tumors. I think I am able to make as good a diagnosis as others, but within two months in my hospital practice last summer there were four cases in which I had made a diagnosis of fibroid tumor of the uterus and felt pretty certain of my diagnosis and in those four cases I was mistaken as was proven on opening the abdomen. One was a solid tumor of the ovary, to which the uterus was very closely adherent so that the cervix moved with the ovary. The other was a thick-walled cyst in a very stout woman (I think it was a dermoid). The third was a case of diseased adnexa closely matted and adherent to the fundus in a woman without any inflammatory history and without fever. I cannot recall the nature of the fourth case. So, to me, the great disadvantage of x-ray treatment is the uncertainty of diagnosis and I think that any of us who have had a great deal of experience will be willing to admit that there is a great deal of uncertainty in abdominal diagnosis.

"I heard a very instructive remark made by William Mayo in reference to x-ray treatment when I was there last fall. In talking about the x-ray and operative procedures he said he looked upon the x-ray (and it struck me as very forcible) in the light that it was a more destructive agent than operation, and that in order to be effective you must really destroy in great measure or practically destroy the ovarian tissue. Now that is not necessary with the operative procedure. There are, or, at least, I find more and more cases in young women in whom I can do a conservative operation; that is, leave enough uterus, enough uterine tissue with endometrium and the adnexa so that they can go on menstruating and, in fact, in many instances bearing children. In those cases in which that cannot be done the condition is such that as a rule the x-ray would be contraindicated because there would be disease of the adnexa or ovary, inflammatory or cystic, so to my mind the cases would be very much limited.

"I think, however, that we must admit there is a class of cases in

which the *x*-ray is of great value and I can recall one case, which is a very good illustration, in a woman who was about forty years of age, who had fibrosis of the uterus, with slight enlargement of the organ. The woman had severe cardiac disease and was not a good operative risk. She did not lose a great deal of blood, but she was very anxious about what little she did lose. She was cured of her menorrhagia. That is an illustrative case of the result of *x*-ray treatment.

"I think we can all say that our mortality in fibroid cases has been reduced very considerably, pretty nearly to 1 or 2 per cent., taking all cases as they come."

DR. G. G. WARD, JR.—"I wish to add my appreciation of the two papers which have been read as being extremely clear and presenting the subject in a way that makes it easy and quick to grasp.

"I would like to ask the readers whether they have had any experience with this treatment in cases where there are calcareous deposits in the fibroid. I recently operated on a case with a fibroid about as large as a small grapefruit which was causing considerable distress from pressure symptoms. It was like a piece of stone. All of us have had, of course, similar experiences. In that case I would like to know whether the *x*-ray treatment as advocated would have been expected to produce any results in the hands of the gentlemen and whether that class of fibroid should not be included in the cases not suitable for the treatment."

DR. HOWARD C. TAYLOR.—"I also wish to express my appreciation of these two papers. I think Dr. Frank's paper on the *x*-ray has been the most clear demonstration that I have ever listened to. There are one or two things that I would like to ask Dr. Stern and Dr. Frank as a matter of personal information. If I understand rightly, the action of the *x*-ray is very largely on the ovary and causes a cessation of its normal functions. If this is the case, in what way is the *x*-ray treatment of fibroids different from that of removal of the ovaries that was used and abandoned years ago?

"I would also like to know if there is a cessation of the functions of the ovaries produced by the *x*-rays, if the symptoms of menopause are ever produced."

DR. HERMANN GRAD.—"The *x*-ray treatment of fibroids apparently resolves itself in producing an amenorrhea."

"Recently a gentleman who is very enthusiastic on the subject of *x*-ray treatment of fibroids referred to me for operation a patient with a large tumor. I asked him why he did not follow up his method of treatment in the case and he said, 'There is nothing to treat here because the woman has passed her climacteric.' I also asked, 'Would you use radium in this case?' He said, 'No; I can accomplish nothing in a case of this kind.' The tumor was very large, the woman is sixty-seven years of age. His idea of treating fibroids with *x*-rays is simply to produce an amenorrhea and there is no doubt that in selected cases of hemorrhage this therapeutic measure as given to us to-night is an exceedingly valuable one. In fibroids with considerable metrorrhagia and menorrhagia, it produces amenorrhea and quiets down the symptoms."

"The question of fibroids and their treatment with the Röntgen rays, as said here to-night, resolves itself into a question of diagnosis. Many times a diagnosis of fibroids is made and on opening the abdomen what do we find? Pathologic masses, the result of inflammation, no neoplasms but tube and ovaries adherent to the uterus, etc. There is no doubt but that in a case of this kind symptoms will clear up because the x -rays will remove inflammatory exudates to a very large extent. I remember very distinctly several cases that I rayed myself a good many years ago, when the rays were first discovered. The Röntgen rays were then used for cancer. Take a case where the uterus is firmly imbedded in the pelvis and is immovable and you x -ray the case first, what does one find at the time of operation? One finds that the uterus has become movable, all the inflammatory infiltrates have been removed and an inoperable case becomes a very easy operable one. That is what happens in a great many of these cases that are so successfully x -rayed. A great many of these cases are inflammatory cases with possibly some fibroids of the uterus here and there and the improvement is due to the fact that the inflammatory condition has subsided. There is no doubt that in severe metrorrhagia one can control the bleeding by the x -ray because one brings about an amenorrhea."

DR. J. BRETTAUER.—"Having been instrumental in introducing the x -ray treatment in this country and having kept in close touch with patients here, as well as at some of the clinics abroad, I can definitely state that the method carried out as it is to-day, is of positive value, and admits of no doubt as to its permanent effect when properly applied.

"I always hesitate to accept statistics which are meant to prove certain results; these figures are not always applicable to the cases of other observers. My personal viewpoint in the matter of fibroids is a very conservative one, which leads me to advise interference only when they cause symptoms. The mere existence of a fibroid, found accidentally or otherwise, is not sufficient to subject the patient to any form of treatment. If we accept the conditions as mentioned by the readers of both papers, we find that only about one-half of the fibroids which require interference can be subjected to x -ray exposures. Formerly, with refracted doses, we aimed only at a symptomatic cure; to-day, with the penetrating rays, we expect and effect a radical cure. Of course, our patients are not yet sufficiently well-posted regarding the value of this form of treatment and very often prefer operative interference. The very case mentioned by Dr. Stern, of a patient becoming pregnant after x -ray treatment caused her two sisters to prefer operation, so that this possibility would be eliminated.

"I want also to mention one particular case: a woman with a large fibroid which never caused any symptoms whatever. It was found accidentally and promptly treated at Freiburg. The result was an amenorrhea and such a shrinking of the growth, that from being an abdominal tumor it became pelvic and caused severe pressure symptoms."

DR. S. STERN, in conclusion.—“This meeting brings me back to a meeting of a gynecological society which I attended in Berlin, only their statistics were slightly reversed. There I heard them say that there were probably 5 per cent. of fibroids which should not be treated with the x -ray. In listening to Dr. Frank's statistics I find that he estimates that 55 per cent. of the cases required no interference. I suppose they required no interference at that time, but there is nothing to tell us that they will not require interference later on. I presume he means no surgical interference. They must have shown some symptoms, otherwise they would not have gone to a gynecologist. They must all have been uncomplicated cases, or they would have needed interference. The symptoms were probably not bad enough to justify a radical surgical operation, but there is no reason I can see why these cases should not receive the benefit of a conservative treatment such as x -ray therapy. I find that there is always the question of the possibility of a mistake. Every time a gynecologist speaks of x -ray treatment of fibroids he immediately confesses to the mistakes he made in the past in diagnosing carcinomata for fibroids.”

“Well, gentlemen, we don't want any cases where there is the slightest doubt in your mind as to the presence of carcinoma. I am sure I don't want to treat a primary carcinoma of the uterus with the x -ray and I do not think any other conscientious x -ray man does either. We want the cases that are absolutely uncomplicated.”

“It is something new to me to hear one of the gentlemen say that he has treated cases where he suspected carcinoma, either to make a diagnosis or to make them more easily operable. I must say he is a very brave man. I would not want to undertake to treat a patient with an operable carcinoma simply to render it more easily operable. The loss of time would hardly be justified by the results accomplished.” (At this point in the discussion, Dr. Grad intervened to say that he desired to clear up any misunderstanding in the mind of Dr. Stern as to the cases he had reference to; that they were cases treated some fourteen or fifteen years ago and not cases of the present day, to which Dr. Stern replied by saying that he imagined the doctor must have had in mind cases of years past as he hardly supposed that any one would pursue such treatment at the present time.)

“As far as the question of calcareous deposits is concerned I would say that I do not remember having treated a single case of this character.

“I don't examine my patients at all. I take the gynecologist's word as to what the patient really has and after every series or two I generally send the patient back to the gynecologist for further examination and report. He generally lets me know how the patient is getting on. I find that my gynecological knowledge is too limited and I don't depend on it at all. It is much more satisfactory to leave the handling of the patient entirely in the hands of the gynecologist and let him decide how the patient is progressing.

“Dr. Taylor asked in what way the x -ray treatment differs from the old method of removing the ovaries. It differs entirely from the

old method. We do not depend upon the deadening of the ovaries to dry up the fibroid. The result is chiefly due to some reflex action produced through the ovaries on the fibroid, now that reflex action is not produced by removing the ovaries. Up to about a year or two ago we thought that all the effect of the *x*-ray on the fibroid was through the ovaries, but since then we have found that it is to a considerable extent also through the fibroid itself. That the *x*-ray has a decided influence on fibrous tissue is demonstrated by the beneficial action of the ray in a number of cases of adenoma of the prostate I treated with good results. The tissue structure of these is probably very similar to that of a fibroid, and there are no ovaries here to influence."

Question.—"Do you cross-fire the testicles?"

Answer.—"No, we do not, we carefully protect the testicles."

"I don't know that there is anything further that I have to add except to say, gentlemen, that this method is really a valuable one and in uncomplicated cases (we don't want any others), *x*-ray treatment offers decided advantages over the operative treatment and if the Röntgen-ray therapist gets these cases I think he will be well satisfied."

DR. R. T. FRANK.—"Please don't mistake me, gentlemen. What I have tried to do is to defend the *x*-ray treatment from its friends. This method came from the Freiburg school where enthusiasm usually runs so wild that it needs defense. This treatment has a very important field. Dr. Stern has been fortunate in having his cases referred to him directly by specialists, cases chosen with care, and I will emphasize that at the beginning of the treatment, when we first started, when I was sending him large numbers of dispensary cases and was feeling my way in the selection of the cases, the results were not as good.

"Dr. Stern spoke about 55 per cent. of cases which were excluded from the start. Those 55 per cent. of cases were cases with no symptoms and whether they will in future require *x*-ray treatment or operation neither I nor any one else is competent to say.

"To Dr. Goffe I will say again that in the 5 per cent. of cases in which the method has been chosen by any one who has studied it and is careful in his selection, operation does not enter in competition because operation must be excluded. It is in those cases where for various reasons, for tuberculosis, nephritis or cardiac disease, or in women so near the verge of insanity or extreme neurasthenia, that you wouldn't risk treatment by operation that the *x*-ray is applicable and necessary.

"As far as Dr. Studdiford's remarks are concerned I would say that, personally, I am not aware that there is such a condition as 'fibroid heart.' I think that when you come to deal with women who have had children and who are past forty years of age it is very hard to substantiate that the vascular condition is due to fibroids.

"In this *x*-ray discussion to-night I was hampered because I was asked to deal with the treatment of fibroids. Personally, I have found the *x*-ray most valuable in the treatment of other conditions,

such as menorrhagia in young girls, where I have been confronted for example with a girl of sixteen or seventeen years, who has been cu-retted three or four times, who has had serum injections, transfusions, etc. Such conditions can be treated successfully by the *x-ray*. They are not sterilized, but the effect of the *x-ray* is such that in the course of six, eight or ten months they menstruate normally, or after a period of amenorrhea lasting eight or ten months they begin to menstruate again. The same holds true of women of thirty where they want children. There the *x-ray* helps us out and these women sometimes have children, as Dr. Stern has told us.

"As far as the question asked by Dr. Ward is concerned I would say that a case of that type would be ruled out by the pressure symptoms.

"In relation to Dr. Taylor's remarks: there have been some six or seven cases where the *x-ray* treatment was discontinued or unsuccessful where the uterus has been removed. Robert Meyer described six cases in which he found distinct changes in the uterus, and especially in the ovary. I have had the opportunity of examining one of Dr. Brettauer's cases in which there was also a distinct decrease in the muscular tissue and an increase in the fibrous tissue of the fibromyomata.

"As far as Dr. Grad's remarks are concerned, I think he is hardly justified in ascribing the changes in inflammatory conditions to the *x-ray*. I think they are due more to the time elapsing between the beginning of the *x-ray* treatment and its completion.

"As far as Dr. Brettauer's remarks are concerned, I agree that diagnosis in Europe is probably not much more advanced than it is here. As far as the value of my statistics is concerned, I disagree with him. A certain number of these cases were private cases of his own where the histories were incomplete. I take it for granted that even in these cases he had good reasons for operating. In the other cases I took the trouble to look up the symptoms, although I did not put them in the statistics in the published paper, and in practically all of the cases in his service there were distinct symptoms such as hemorrhage, pain and complications of various kinds indicating the necessity for operation.

"In conclusion I simply want to say that, under proper selection, this treatment is absolutely invaluable; that the selection of cases, however, must be left in the hands of a competent gynecologist, and I want to warn Dr. Stern that if he is ever in the position of having cases referred to him by a general practitioner who is not competent to judge the vaginal findings exactly, that he will do better to decline to treat the case."

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, Held February 23, 1915.

The Secretary, DR. GEORGE W. KOSMAK, in the Chair.

This program was contributed by the members of the staff of the Mt. Sinai Hospital.

DR. JOSEPH BRETTAUER reported

THREE CASES OF FIBROIDS COMPLICATED BY CARCINOMA OF THE INTESTINE; RESECTION, RECOVERY.

CASE I.—This was a case of fibroid of the uterus complicated by adenocarcinoma of the sigmoid in which there were absolutely no symptoms pointing to the complicating disease, which was discovered accidentally during the operation for fibroid. At operation the sigmoid was resected to the extent of about 4 inches. The proximal end was pulled through the remaining part of the rectum and fastened at the anus. The pelvic peritoneum was closed entirely. The patient made an uninterrupted recovery, with full control of the sphincter ani and three years after the operation was perfectly well.

CASE II.—This patient, fifty-one years of age, entered Mount Sinai Hospital, December 1, 1912. Menstruation had always been normal. She had had one child twenty-seven years previously. For the past six months she had complained of shortness of breath, slight bearing down, and had noticed an enlargement of the abdomen. The uterus was hard, enlarged to the size of a three months' pregnancy, and freely movable. To the left and above a separate mass was felt, somewhat softer in consistency and freely movable, which was suspected to be a malignant ovarian neoplasm. (This case was reported in the AMERICAN JOURNAL OF OBSTETRICS, 1909, vol. lx, Transactions of the New York Obstetrical Society.) On opening the abdomen the mass proved to be a solid growth, originating from the mesosigmoid close to its attachment to the gut; down along the sigmoid two more nodular masses were felt. After a supravaginal amputation of the fibroid uterus, the sigmoid was resected, the proximal end being drawn through the rectal end and fastened at the anal orifice. The convalescence was long and stormy. A communication established itself between the rectum and cervix. There was a gradual prolapse of the sigmoid into the rectum. The difficulties during convalescence were all encountered in overcoming the strictured portion of the anastomosis. In view

of the pathological report of round-celled sarcoma of the mesentery and metastases in the mesentery and in the intestinal wall, steps for radical relief were not considered. The rectovaginal fistula closed spontaneously. The difficulty in defecation improved gradually and when the patient was discharged from the hospital her condition was satisfactory. On February 15, 1915, the patient's condition was excellent. A slight annular constriction could be felt by rectum about $2\frac{1}{2}$ inches from the anus, which caused no symptoms whatever. There is a metastatic swelling the size of an egg in the tenth intercostal space, the nature of which is somewhat suspicious. Excision is not thought of, as if this is a metastasis, there are undoubtedly others situated elsewhere. Microscopically the tumor of the mesentery proved to be a primary polymorphous-celled sarcoma. The nodules in the mesentery and in the sigmoid were both metastatic sarcoma.

CASE III.—This patient was a nullipara, forty-one years of age, who had complained for years of pain in both inguinal regions, radiating mainly down the left thigh. Bimanual examination showed a fixed retroflexed uterus, both appendages enlarged, adherent and tender, the left apparently containing fluid.

On opening the abdomen the sigmoid flexure was found covered with dense adhesions which formed a tumor-like mass, the lower pole was soft and was immediately broken into in an attempt to reach the tightly bound down uterus. The entire mass was about 5 inches in length and proved to be a well shut off abscess cavity, caused by the perforation of an adenocarcinomatous ulceration in the lower sigmoid. This was freed, resected and an end-to-end anastomosis established with a Murphy button. On freeing the uterus and appendages, the right ovary was found tightly adherent and carcinomatous. The entire posterior surface of the uterus was covered with necrotic masses, and here and there, small metastases were noted. The left appendages presented the appearance of a tuboovarian cyst, which was tightly adherent. The uterus and both appendages were removed. There were indurated areas left in the pelvis, which were beyond the possibility of removal. The anastomosis of the gut was covered as well as possible with peritoneum and mesosigmoid. The peritoneal cavity was closed entirely and a retroperitoneal drain inserted in the vagina. Recovery was practically uneventful. The button was easily removed from the rectum on the twentieth day, with intestinal function normally reestablished.

The pathological diagnosis was adenocarcinoma of the intestine and ovary and of the posterior surface of the uterus. There appeared to be two distinct types of neoplasm present. About four months after this operation the patient, who up to this time (Sept. 25) had been comfortable, began to show symptoms of stricture of the rectum. Large hard masses of the recurrent tumor could be felt in the pelvis. An artificial anus was established on October 10. At this time the finger introduced into the peritoneal cavity, could distinguish omentum, retroperitoneal glands and mesentery, rid-

dled with metastatic growths. The benefit derived from the artificial anus was only temporary and the patient died on December 1.

These cases were reported because of the absolute lack in all of them of any symptoms pointing to intestinal disease. In all three cases this complication was encountered when operating for another cause. When the histories were gone into again, after the actual state of affairs was known, no such symptoms could be elicited. Again, with regard to the method of establishing intestinal anastomosis, time was of importance in all of the cases, the patient having been on the operating-table for some time. The method employed in the first two cases was the one requiring the least time. In the third case he had used the Murphy button, which could also have been used in the others.

DISCUSSION.

DR. HOWARD C. TAYLOR recalled that some years ago when he assisted Dr. Tuttle they frequently found these conditions of the sigmoid and sometimes they treated them in unusual ways. In one such case in which they did not wish to lose time the choice lay between an artificial anus or joining the portion of the sigmoid to the top of the vagina. The latter procedure was chosen and was easy to do. The patient made a good recovery. She had one movement a day after which the vagina was washed out. There was no trouble whatever from the movement passing through the vagina.

VAGINAL SUBTOTAL HYSTERECTOMY FOR PROCIDENTIA AND LARGE CYSTORECTOCELE, ASSOCIATED WITH CHRONIC FIBROSIS UTERI.

DR. HIRAM N. VINEBERG reported this case. He stated that it was well established that vaginal fixation, or the more recent term interposition, fulfilled the object in view in most cases of procidentia and large cystorectoceles, when the climateric was near at hand, or when the woman had already borne a good-sized family and further pregnancies might be eliminated. But, the operation called for a fairly normal uterus. If the uterus was very large because of the existence of fibroid nodules or diffuse fibrosis, or was exceedingly small, through senile atrophy, it was contraindicated. The same applied to the uterus, which though of normal size was the subject of uncontrollable bleeding. Such cases were usually observed in women approaching the menopause.

The method of procedure in chronic fibrosis, associated with procidentia or cystorectocoele, had consisted either in total hysterectomy, with the customary plastic on the vaginal walls, or with the excision of a wedge-shaped portion from the body and fundus. The first procedure possessed the objection that it left no solid tissue, which could act as a support to the bladder. Whether this deficiency could be met by the technic of Goffe and Mayo, whereby the round ligament, in the one case, and the broad ligament in the other, were sutured together, Dr. Vineberg was unable to say from personal

experience. This much might be said, however, that the technic in either case demanded the greatest skill and the most extensive experience. The second method, that of the excision of a wedge-shaped piece from the body and fundus, and with which the speaker had had considerable experience, fulfilled the purpose in some cases and had the advantage in not creating an artificial menopause. But it had its drawbacks in that the uterus in many cases, was too bulky and its walls too thick and fibrous to lend themselves to the procedure. Furthermore, in all instances it left a long line of sutures that did not always heal kindly. Indeed this might be attended with profuse and prolonged suppuration.

A third vaginal method, which Dr. Vineberg had been practising for over three years consisted in amputating the body of the uterus fairly high up and utilizing the cervical stump as a *pelotte* to hold up the bladder. When the woman was still comparatively young and the creation of an artificial menopause might seem undesirable, the amputation might be done so high up as to leave together with the adnexa the lower segment of the uterus, with a corresponding area of endometrium. Not infrequently a difficulty presented itself in that the vaginal portion was very much hypertrophied and elongated, or badly lacerated with considerable eversion of the cervical mucosa. Where these conditions were present it had been his custom to amputate the lower portion of the cervix, leaving only a comparatively short cervical stump extending from the vaginal vault to the lower uterine segment and using this to support the bladder. After the redundant vaginal flaps were resected to the extent that the individual case demanded, the cervical stump was sutured to the subpubic fascia and to the anterior vaginal wall. The bladder was then forced to take a position within the abdomen and its prolapse was prevented by the firmly fixed cervical stump. The operation was completed by doing the necessary operation upon the posterior vaginal wall and perineum.

Dr. Vineberg said that thus far he had had occasion to perform this operation ten times, the first operation having been done over three years ago. Two of the operations were done during the past two months, hence must be excluded for the present. Of the other eight cases, one had been under observation for three years and three months, two for fifteen months, two for twelve months, and three were lost sight of after they left the hospital. The results in all the observed cases were excellent from an anatomic standpoint, excepting in one. This patient continued to complain of a bearing-down feeling and frequent micturition, though there was no recurrence of the cystocele, but the vaginal portion of the cervix came down to the introitus. In this instance it would have been wise to have done a partial amputation of the cervix, as had been done in some of the other cases with long and hypertrophied vaginal portions.

The value of the procedure was well illustrated in one case, that of a patient twenty-three years of age, who had had an abdominal supravaginal hysterectomy done in an out-of-town hospital

sixteen months before she was admitted to Mount Sinai Hospital. A few months after the operation she noticed that everything came down as before the operation. At the time of admission the long cervix with bladder and rectum protruded from the vagina. At operation the anterior vaginal wall was incised from the urethral meatus to near the cervical os; the bladder was dissected away from the cervix and the base of the broad ligaments. On opening the peritoneal cavity a long fibrous band was found stretching from the cervical stump to the abdominal wall. This was severed. The redundant vaginal flaps were excised and after the cervical stump was shortened by a liberal excision of its lower part, it was sutured to the subpubic fascia and to the vaginal wall as described above. The operation was completed by a suitable posterior colporrhaphy. Dr. Vineberg said he had examined the patient yesterday, seven months after the operation, and the result was perfect. The cervical stump was high in the vaginal vault, both vaginal walls were in apposition, and when the patient bore down there was as little protrusion of the anterior vaginal wall, as there would be in a normal nullipara.

DISCUSSION.

DR. J. RIDDLE GOFFE said that he had had no experience with the method described by Dr. Vineberg but there were one or two questions which he would like to ask. Dr. Vineberg had said nothing about controlling the blood supply. Unless the blood-vessels were ligated there would be serious hemorrhage. Another question was, how did he dispose of the bladder? Did he put it on top of the cervical stump and leave it to take care of itself or did he stitch it in some definite position. We must not deceive ourselves with the idea that the cervix holds up the bladder. The cervix in this instance is simply the point of insertion of the cardinal ligaments. It is the ligaments that afford the necessary support. Dr. Goffe said that he preferred to get rid of the old infected cervix and utilize the ligaments exclusively for this support as in the operation for cystocele, which he devised and which is known by his name.

DR. ARNOLD STURMDORF said that when gynecologists of Dr. Vineberg's experience find it necessary to devise new methods for the cure of cystocele, it becomes evident that the prevailing methods are unsatisfactory in results.

Just so long as operators continue to center their conceptions and procedures upon supporting elements and ignore the mechanism of displacing factors, so long will they fail to cure many cases of bladder prolapse.

The bladder has no true ligamentous support, its fascial and ligamentous equipment is only one element in a perfect mechanism, that counteracts the expulsive force of intraabdominal pressure, not by textural resistance, but by deflecting the direction of intraabdominal pressure toward the normal pelvic outlets.

The musculature of the pelvic floor and the mobile uterus present

a complicated deflecting mechanism and in order to restore and maintain normal pelvic topography these elements must be restored to normal position and function.

No one dreams of omitting restoration of the pelvic musculature in cystocele operations to-day; it is the attempt to permanently fix the bladder that runs us amuck. Any attempt to anchor the bladder in abnormal position is unsurgical, unanatomical and futile.

In the so-called interposition operation, the bladder fortunately for the operator, often slips back into its normal position and when it does not failure ensues; its permanent fixation above and behind the fundus is a physiological impossibility. Dr. Goffe's operation fixes the bladder in its normal position and by just so much is it superior to and in advance of other methods.

DR. FURNISS said that he believed that if most of the patients with prolapse and big hypertrophied cervices and uteri were put to bed and given douches for three weeks to a month that it would not be necessary to amputate the cervices and the funduses of the uteri before doing an interposition operation. Involution would progress to such an extent that this would not be called for. Another point is that by such treatment the edema of the surrounding structures would disappear and the operation would be technically much easier. He wished to call attention to the subsequent bladder trouble; he had known of instances of the infection extending to the kidneys, and of one case of death from such a cause.

He wished to disagree with Dr. Sturmdorf about the position of the bladder. He had examined many such cases after operation and the fundus of the uterus had always been found under the trigonum, lifting it up. The ureters opened on either side of this elevation.

DR. HOWARD C. TAYLOR said that there was one point that Dr. Vineberg brought out, that in the attempt to do an interposition operation where the uterus was too large there were three ways of meeting the difficulty. These Dr. Vineberg outlined. It must be remembered that it is of practical importance to leave organs in their anatomical relations and to try to cure symptoms, and instead of interposing the entire uterus it might be satisfactory to fasten the anterior surface of the fundus to the abdominal wall by ventral fixation. He had assumed that the abdominal wall would support the uterus and had attached it to that and found that it gave good results.

DR. HIRAM N. VINEBERG, in replying to Dr. Goffe, said that he left a cervical stump and a sufficient blood supply. If Dr. Goffe implied by his question that the nutrition of the cervical stump would suffer there need be no such fear. The section is similar to an abdominal supravaginal hysterectomy with the only difference that it is done through the vagina. As to the ligation of the blood-vessels, he had not mentioned that as he took for granted that they understood that such vessels were ligated as was usually done. The bladder was disposed of in the same way as in the inter-

position operation. It had given him great pleasure to see Dr. Goffe perform his operation but it seemed difficult to perform and all could not do it as skillfully as he did. He had some hesitancy in suturing the bases of the broad ligaments. Looking at the field from above after a panhysterectomy one could see that to suture the lower part of the broad ligaments together would bring about considerable tension and this was not desirable. Where the cervix was hypertrophied or deeply lacerated he amputated the lower portion, leaving only a short stump extending from the vaginal vault to the lower uterine segment, and he used this to support the bladder.

Dr. Hiram N. Vineberg, in closing the discussion, said that he had read Dr. Sturmdorf's paper to which reference had been made and all he could say was that it was beyond his comprehension. Months after some of these operations, on opening the abdomen, the bladder was found riding over the fundus. According to Dr. Sturmdorf's theories no good results ought to be expected but they did occur nevertheless. With regard to keeping the patients in bed for a while before they were operated upon, in the wards of the hospital this could sometimes be done and was easier than with private patients. The private patient who entered the hospital wanted to be operated on the next day. The involution spoken of did not take place in cases of fibroids or fibrosis. In such cases there was no reduction in the size of the uterus no matter how long the patients would be kept in bed. In all cases it was a matter of selection. One should not leave behind an organ that gave rise to nervous symptoms and there is no pelvic condition more fruitful of manifold nervous disturbances than a uterus in a state of chronic metritis or fibrosis. With the operation which he had described he had secured perfect anatomical results and relief from symptoms.

INTRAPERITONEAL HEMORRHAGE OF UNKNOWN ORIGIN.

DR. ROBERT T. FRANK reported this case, which was the third of the kind which he had encountered, where on opening the abdomen a large intraperitoneal hemorrhage was found, the source of which was never determined.

The patient was twenty-three years of age and single. Her menstrual history had been normal until a year ago when dysmenorrhea and menorrhagia developed. Three days ago there was an acute onset of abdominal pain and faintness. The bowels were constipated and urination painful and frequent. There was no vomiting.

The patient looked ill, breathing was costal and the skin and mucosa were pale and slightly cyanosed. The pulse was 120 and temperature 105° F. The abdomen was slightly distended, extremely tender, with slight general rigidity. There was no dullness in the flanks. A large hard tumor was felt in the right hypochondrium reaching to the umbilicus. The uterus could not be outlined. A diagnosis of ovarian cyst with twisted pedicle was made.

A laparotomy was immediately performed and a large amount of fluid and clotted blood evacuated. The tumor proved to be a firm fibroid of the uterus. The adnexa were normal. Thorough exploration of the liver, spleen, stomach and all the viscera was made. Nothing abnormal was found except some flat jelly-like deposits on the intestines. On close inspection of the fibroid a hole in a thin-walled vein on the surface of the tumor was found. This was considered the source of the bleeding. Rapid supravaginal hysterectomy with the removal of the right adnexa was performed. The wound was closed by through-and-through sutures and the operation followed by a saline infusion. Convalescence was steady though slow.

The specimen showed a hard fibroid with tuberculosis of the endometrium and ovary. The pin point opening in the vein was reported as traumatic and was made at the time of operation.

The real source of the hemorrhage was not found.

DERMOID CYST OF THE OVARY WITH CARCINOMATOUS CHANGE.

DR. ROBERT T. FRANK, also presented this report. He stated that about forty cases of this nature had been reported in the literature. The prognosis was usually bad as recurrence ordinarily occurred.

The patient was fifty years of age, married, and was admitted to Dr. Brettauer's service, June 20, 1914. She had had no children, but two abortions. The menopause had occurred six years before. She had been told that she had an abdominal tumor nineteen years before; for the past two years the tumor had increased in size. The patient complained of a feeling of weight in the abdomen, backache and pain on urination.

Her appearance was emaciated; she was darkly pigmented. The abdomen was prominent, lax, and contained a tumor in the median line. The tumor was globular, smooth, movable, and extended to halfway between the xyphoid and the umbilicus. A diagnosis of ovarian cyst was made.

At laparotomy on June 6 a right ovarian cyst, the size of an adult head, was removed. The cyst contained hair and sebaceous matter. At one pole was a thickened area, gelatinous in consistency with putty-like inclusions.

Microscopical examination by Dr. F. S. Mandlebaum showed carcinomatous areas in the nodule of the dermoid.

Some months later the patient was readmitted to the hospital with symptoms pointing to lung and vertebral involvement (confirmed by x-ray). No response to recent inquiry had been obtained.

CESAREAN SECTION NECESSITATED BY LARGE GAERTNER'S CYSTS

DR. ROBERT T. FRANK stated that this patient was first seen in August, 1913, when she was seven and one-half months pregnant. She had been married fourteen years and had two children. Since her pregnancy she had noticed a large protrusion from the right

buttock and a feeling of fullness in the vagina. Examination showed a seven and one-half months' cephalic presentation, a large cystic mass, which caused the right buttock to protrude 3 inches beyond the other (in the lithotomy position). The vaginal outlet was relaxed and the pelvic cavity greatly encroached upon by the cystic mass which apparently lay to the right of the vagina. Above the large cyst was another one, the size of an orange, extending to the promontory. The vaginal walls showed many varicose thin-walled veins.

As labor through the natural passages was not possible, except if preceded by drainage of the cyst, and this course was considered inadvisable on account of the dangers of hemorrhage and infection, Cesarean section was elected.

At term the child was delivered by abdominal Cesarean section. The mother convalesced normally and presented herself five months later for the removal of the cysts. A large cystic mass in the buttock, the size of a small grapefruit, pushing the right and posterior vaginal walls inward was found. Above this was a cyst the size of a walnut. The uterus was completely prolapsed. The distended veins had disappeared and the tumors were smaller than during pregnancy.

The patient was later readmitted to the hospital because of her complete prolapse. On examination a cystic mass the size of a large lemon was discovered behind and to the right of the vagina. Either a small cyst had been overlooked or had grown in the interval, or a small portion of the cyst wall had escaped excision and reformed as a cyst. A week later the speaker again operated, making a vaginal incision corresponding to the right leg of a Hegar denudation. Through this cut a bilocular cyst intimately adherent to the right lateral and posterior rectal walls was removed after the fibers of the right levator ani were cut across. The dissection had to be carried up to the peritoneal reflection, and the lower 4 inches of the rectum had to be mobilized as for a resection of the rectum. After removal of the cyst a large Hegar denudation was done and a typical colpoperineorrhaphy performed. The patient had since remained cured.

Dr. F. S. Mandlebaum had reported that the cysts were composed of a fibromuscular wall, lacked definite epithelial lining and probably originated from Gaertner's ducts. Ordinary cysts of this nature did not, as a rule, attain sufficient size to obstruct labor or to cause as great technical difficulties in their removal as in the case reported.

DISCUSSION.

DR. GEORGE W. KOSMAK asked if there was in the first case any possibility that the hemorrhage had come from a corpus luteum. He said that he asked this question because a case had been reported at a recent meeting in which, after a prolonged search, the source of the hemorrhage was found to be a corpus luteum.

DR. FRANK, in reply to Dr. Kosmak's question, said that the hemorrhage was not from a corpus luteum; he had searched every

viscus, even the pancreas and had failed to find the bleeding point. It seemed that all sources of hemorrhage had been excluded. He recalled a somewhat similar case in which the source of hemorrhage could not be discovered. This case came to autopsy and even then, though colored solution was run through the circulatory system, nothing could be found.

In regard to dermoid cysts becoming carcinomatous; it was stated that 1 per cent. of dermoids became malignant. These cases should not be looked upon as benign, even though the cancer was within the cyst, since there was danger that they might later metastasize.

AMPULLAR PREGNANCY.

DR. SOLOMON WIENER presented this report. He stated that the patient was twenty-six years of age, married five years, the mother of three children, the last born one year ago. Menstruation began at the age of fourteen years and was of the four weekly type, lasting from six to seven days and painful.

Seven weeks ago the patient had had a normal menstrual period, but instead of stopping there had been spotting for four weeks. She had suffered only slight pain. She had been curetted four weeks ago but continued to flow. She had had some pain in the left side for two weeks after the curettage, but this had subsided. She had never had chills or fever. The bowels and urination were normal.

Physical examination showed the pulse 88 and temperature 100° F. The abdomen was soft, the uterus slightly enlarged, and a small soft mass to the left of the uterus. A diagnosis of ectopic gestation was made. At operation, twenty-four hours after admission to the hospital, the uterus was first explored and found empty. An anterior vaginal celiotomy was done, the left tube and ovary being delivered into the vagina and resected. The tube was adherent at its fimbriated end to the wall of the pelvis and contained a small ampullar pregnancy. The ovary was the site of a cyst the size of a large plum. This was ruptured in delivery. The right adnexa were normal. The wound was closed without drainage and recovery was uneventful.

The points of interest were the ovarian mass which was taken for an ectopic pregnancy, whereas the actual ampullar pregnancy had not been palpated; the sealing off of the end of the tube against the pelvic wall which prevented tubal abortion; the absence of amenorrhea and the slight amount of pain. Dr. Wiener also referred to the limitations of the vaginal route. He said that in this type of case in which there was only a slight enlargement of the tube the vaginal operation was the ideal procedure. He had done a vaginal salpingectomy for ectopic gestation a number of times; the patients showed no more reaction than after a simple curettage and were spared the discomforts following a laparotomy, as well as the shock of that procedure. Whether more advanced cases of ectopic, or cases with extensive bleeding, should be operated *per vaginam* was a question which he felt must be answered in the negative.

A CASE OF FOREIGN BODY IN THE UTERUS: INFECTED ABORTION.

DR. SOLOMON WIENER also reported this case and presented the foreign body which was a tightly wound and compressed cylinder of cotton, $3\frac{1}{2}$ inches in length and about a quarter of an inch in diameter when removed. It was of special interest from the fact that the patient had inserted it into the uterus herself.

The history of the case was as follows: The patient, twenty years of age had been married three years and had one child fourteen months old. She had had no abortions. The last menstruation had occurred eight weeks ago and the patient believing herself pregnant had been taking "ergo tapiol" and giving herself hot douches for about a week in order to induce abortion. She persistently denied instrumental interference by herself or anyone else. Three days before Dr. Wiener saw the patient she began to bleed per vaginam. This hemorrhage had persisted with increased pain and vomiting. The day before he saw her she felt feverish. Early on the day on which he saw her in consultation, her family physician had been summoned and found her with a temperature of 103.4° F. Just before he had seen her, her temperature rose to 105° F. and the pulse to 120.

Examination showed a young woman who in spite of her temperature did not look gravely ill. There was a slight malodorous bloody vaginal discharge. The cervix was open admitting the tip of the finger which impinged against a soft mass which was taken to be blood clots and the products of conception. The uterus was enlarged to the size of a two months' pregnancy and was very soft. There were no adnexal masses. Dr. Wiener, despite the patient's denial, ventured the guess that there had been some intrauterine interference. The uterus was dilated without anesthesia and its cavity gently cleaned out with the curet; the first thing to be brought away was this foreign body and then a foul necrotic ovum. No attempt was made to curet the uterine cavity thoroughly or remove the entire decidua because of the danger of opening lymphatics and spreading infection. A hot intrauterine irrigation was given and the vagina only loosely packed with gauze. The patient made a very rapid recovery. There was no development of adnexal inflammation or pelvic exudate. Evidently the high temperature was due to sapremia and not to a virulent spreading infection.

The patient when confronted with the *corpus alienum* admitted that she had inserted it herself four days previously. Having tightly rolled the cotton cylinder, she dipped it into some pure lysol, and then passed it along one finger inserted into the vagina "into her womb" to use her own words. To her dismay the cotton slipped from her grasp and she was unable to recover it.

Dr. Wiener said that the statement that a patient had passed something into her uterus by her own unaided efforts was often received with surprise or incredulity; yet there were many women who had borne one or more children who could easily reach the os uteri themselves. Dr. Wiener recalled the case of a woman who successfully induced four abortions on herself by inserting a knitting

needle which she had previously sterilized by boiling. Her fifth attempt was equally successful in bringing on an abortion, but it was followed by a fulminant sepsis which cost her life.

DISCUSSION ON DR. WIENER'S PRESENTATIONS.

DR. WIENER said that in reference to Dr. Vineberg's question as to why the ovary was removed in the second case, that the ovary was not normal; it was enlarged and contained a cyst the size of a plum but the other ovary was normal and was conserved.

TUBAL GESTATION COMPLICATED BY PERNICIOUS VOMITING.

DR. S. H. GEIST presented this report. He stated that the case was of interest because of the rather unusual clinical history and the course of the disease. Pernicious vomiting and jaundice had been described in very early intrauterine pregnancies, while jaundice had also been described associated with extrauterine pregnancy when there had been bleeding into the peritoneal cavity, but he had been unable to find any mention of the condition of pernicious vomiting and jaundice in an unruptured living, tubal pregnancy.

The patient, a woman thirty-two years of age, was admitted to the service of Dr. Brettauer, October 15, 1914, and discharged five weeks later. Three years before she had had a left salpingectomy for tubal gestation. Since that time her menstrual history had been normal. The last regular period was two months before. She had been married thirteen years but had had no pregnancies other than the tubal gestation three years ago.

Four weeks before admission to the hospital she began to vomit at first only in the morning, but gradually with increased frequency until she was vomiting from ten to fifteen times daily. She was constantly nauseated and complained of some epigastric pain. For the past two weeks she had had no irregular uterine bleeding.

The general physical examination was negative. The local examination showed a softened cervix and a slightly enlarged and movable uterus. At the left cornu was a soft mass the size of a lemon; to the right and high up an indefinite cystic mass was felt. Four days after admission the patient became slightly jaundiced. The diagnosis was either an intrauterine or an interstitial pregnancy with pernicious vomiting.

One week after admission the patient was operated upon. The uterus was found empty. A laparotomy was done and at the left corner was found an intramural fibroid. The cystic mass on the right proved to be an unruptured, living eight weeks, tubal gestation. The tube was removed, the myoma enucleated, and the patient promptly stopped vomiting. She made a rapid recovery except for a mild femoral phlebitis on the right side which lasted about a week.

A chemical investigation of the urine by Dr. A. Epstein showed a marked increase in the amount of acetone and diacetic acid, a

very faint trace of albumin and no sugar. The total nitrogen was 3.6 grams, the ammonia nitrogen 0.6 grams or 16 per cent. which was excessive, the normal being 3.4 per cent. A second examination showed a total nitrogen of 7.25 grams and an ammonia nitrogen of 1.1 grams or 14 per cent. This excess indicated an intense acidosis. To determine liver function and carbohydrate tolerance 50 grams of glucose in coffee was administered. Part of this was vomited an hour later. Urinary examination an hour after the ingestion showed the presence of sugar, which was a sign of lowered carbohydrate tolerance and therefore of severe functional disturbance of the liver. The patient also passed an abnormal quantity of bile pigments. Even with these marked abnormalities one could say that the disturbance of the liver was still of a functional nature as neither leucin nor tyrosin were present in the urine and all these abnormalities promptly ceased after the operation and with the cessation of vomiting. The starvation from the constant vomiting was probably responsible for the greater part of the acidosis and the liver condition was also due to the starvation.

It is the consensus of opinion that pernicious vomiting is due to a toxic substance elaborated by the fetal metabolism. One could feel certain that in this case the theories which implicate the uterus, such as overdistention, malposition, lacerations, etc., found no application.

A CASE OF CHORIOEPITHELIOMA, THREE AND A QUARTER YEARS AFTER
THE LAST PREGNANCY.

DR. S. H. GEIST presented this report, in which he stated that chorioepithelioma of the uterus was a unique tumor in that it presented a truly parasitic neoplasm for the cells which constituted the tumor arose from a source other than the host. It had been shown by careful histological study that the cells of the chorioepithelioma arose from the epithelium covering the chorionic villi, which therefore necessitated a pregnancy for the origin of this type of tumor. Various cases had been reported in which a relatively long period of latency existed, in fact one case had been reported in which eighteen years after the last pregnancy chorionic villi were found in a vein. The tumors varied greatly in malignancy, some growing rapidly and terminating fatally, others, even after the appearance of metastases, might regress. Up to the present time they were unable to say which type would prove malignant and which benign in its course and for the sake of safety every case definitely diagnosed was to be operated upon.

The case presented was that of a woman, forty-six years of age, admitted to Dr. Brettauer's service December 4, 1914. Menstruation had been normal until a year ago when it became irregular occurring every five to seven weeks and was rather profuse. The patient had been married twenty-six years and had had nine children, the last three and one-quarter years ago. She had had one miscarriage eleven years ago. Six months ago at what she considered her regular period she began to bleed profusely. She was told by a physician at that

time that she had a tumor and should be operated upon. A second physician curetted her without relief. Seven weeks ago she had had another profuse hemorrhage and was infused at Gouverneur Hospital. She had continued to bleed since and entered Mount Sinai Hospital for that reason.

The general physical examination was negative, except for a moderate anemia. Locally the cervix was hard and irregularly torn, the uterus enlarged and irregular with a distinct nodule the size of a pigeon's egg at the left cornu. The patient was bleeding. The blood examination showed hemoglobin 60 per cent. A diagnosis of fibromyoma of the submucous variety was made and a vaginal hysterectomy done. The adnexa were normal and one ovary was not removed. During the operation it was noticed that the hemorrhage was rather profuse.

The specimen showed a uterus slightly enlarged, pale, and measuring 8.5 cm. in length. The cavity was somewhat dilated and showed a polypoid reddish tumor mass in the left cornu about the size of a grapefruit. The left lateral wall of the uterus bulged somewhat due to the presence of the tumor which extended from the mucosa through the uterine wall in a wedge-shaped fashion. The tumor was friable, the size of a plum, nonencapsulated, and hemorrhagic in character. The histological examination proved it to be chorioepithelioma. The convalescence was uneventful and up to the present time there had been no recurrence, or evidence of metastases. The interest in this case centered in the relatively long period of latency, the benign character of the growth, and the fact that it followed a normal pregnancy.

DISCUSSION.

DR. HIRAM N. VINEBERG asked why in the case of pernicious vomiting they had waited a week before interfering. He recalled one case of pernicious vomiting in which there was a delay of three or four weeks in a prominent lying-in hospital and the woman when seen by him was in a deplorable condition. The uterus was emptied in the forlorn hope that it still might be of benefit but the woman died. These cases of pernicious vomiting are very treacherous and one ought not to go on waiting, but should empty the uterus promptly or as soon as a conclusion has been reached that we are dealing with that complication. Dr. Vineberg said he had had ten cases of chorioepithelioma. This condition developed more frequently after hydatid mole than any other condition. When a profuse hemorrhage occurs subsequent to a miscarriage or to a hydatid mole one should suspect chorioepithelioma. In his first case which followed a hydatid mole the hemorrhage was so sudden and so alarming that he had no hesitation in making the diagnosis of chorioepithelioma. The clinical history and the local findings are frequently sufficient to justify a diagnosis at times, as in one of his cases, and are more reliable than the microscopic examinations.

DR. LAWRENCE STRONG said that Dr. Geist's last case was very

interesting histologically as having some bearing on malignancy. There were cases in which secundines were retained for many years after a miscarriage and it might be that villi or wandering cells after a long period gave rise to chorioepithelioma which became malignant. During the time these cases were border-line conditions it might be very difficult to make a diagnosis by means of the microscope.

DR. ABRAHAM RONGY said that in the first case the toxemia must have arisen from the products of conception as there was no disturbance of the uterus from pregnancy in the tubes. The kidney disturbance was secondary. If they supposed they had an ectopic pregnancy would this case not have reacted to the Abderhalden test?

In regard to the second case, the chorioepithelioma, he had met with three cases of chorioepithelioma discovered accidentally. One of these began bleeding three months after having had a miscarriage and an interposition operation and a curettage was done and the chorioepithelioma discovered. Another case was in a woman who had about reached the menopause and was not pregnant. She bled irregularly three or four months and malignancy was suspected. A hysterectomy was done and the condition was found to be chorioepithelioma. If, after a woman miscarried, there was sudden hemorrhage, atypical in character, it was well to bear in mind the possibility of chorioepithelioma. Two of these three cases were discovered accidentally. These cases were very interesting and more of them ought to be reported.

In closing the discussion Dr. S. H. Geist said that he agreed with Dr. Strong as to the difficulties in making a positive diagnosis of chorioepithelioma from curettings and that in border-line cases where a placental polyp has existed the microscope oftentimes cannot make an absolutely final diagnosis. In this particular case there was, however, an infiltrating tumor present that had involved the entire thickness of the uterine wall. This woman had not been curetted as she was not suspected of having a chorioepithelioma. Her last pregnancy dated back three and a quarter years and she had nothing to indicate chorioepithelioma.

In reply to Dr. Rongy he said that he considered the Abderhalden test unreliable as he had worked with it for one and a half years at Mount Sinai Hospital in conjunction with Dr. Epstein, and furthermore they had diagnosed pregnancy on this patient and so the test even if reliable could not have added any information. Dr. Vineberg asked why the operation was delayed in the case of pernicious vomiting. They had not made a definite diagnosis as to whether the vomiting was due to a neurosis or to a toxemia and it was only after diet had failed to influence the condition and with the appearance of jaundice that they felt sure of this important point.

Stated Meeting, Held March 23, 1915.

The Chairman, DR. LEROY BROWN in the Chair.

AN UNUSUAL CASE OF HYDATID MOLE.

DR. MALCOLM McLEAN said he had been called to see this case four weeks ago and he wished to report it not only because hydatid mole was an unusual condition but because the subsequent history of the case was so remarkable.

The patient who was supposed to be three and one-half months pregnant was suffering with terrific cutting pains in the abdomen similar in character to those of a ruptured extrauterine pregnancy. Examination showed that the uterus was occupied by the products of gestation. The uterine walls were extremely thin and a boggy mass could be palpated. There was no dilatation of the cervix. He left the patient with instructions that she should be carefully watched. He had been gone about three hours when he was called up and told that the woman had a terrific hemorrhage. The uterus was emptied and the proper remedial measures applied, after which the patient did well for three or four days. She was then seized with a violent chill, a high temperature and another profuse hemorrhage. The uterus was thoroughly cleaned out, swabbed with iodine, etc., and she again went along in apparently a normal way for some days; then she had another chill and hemorrhage. This was repeated at intervals of about three days, the temperature going as high as 105° F. The degree of hemorrhage after the successive chills became less, but thus far all treatment had failed to prevent the repetition of the chills. She would make just so much normal progress and then would have another chill.

Dr. McLean presented the specimen of hydatid mole that had been removed, which had the typical grape-like appearance.

DR. POLAK asked Dr. McLean what method he had used to clean out the uterus.

DR. McLEAN replied that the uterus had been cleaned out manually and by the ring forceps. The uterus had been emptied and the vagina packed when he arrived.

Dr. McLean said the case was most peculiar as it did not take the course of a septicemia nor could one account for the repeated hemorrhages unless by retention of some of the material.

DR. POLAK asked if the ovaries had been found enlarged.

DR. McLEAN replied that the ovaries were not enlarged, but he had never seen so thin a uterine wall; it was as thin as a sheet and the ring forceps could be distinctly felt through the walls.

DR. HIRAM N. VINEBERG said that a polycystic degeneration of the ovaries was sometimes found in connection with hydatid mole but not in all cases. In the two cases which he had seen recently there had been no enlargement of the ovaries.

In one case a couple of months ago occurring in a woman forty-

nine years of age, the history was that she had passed the menstrual period one or two weeks and then began to bleed, the bleeding continued for several weeks; the uterus was enlarged to size of the gravid organ at four months and he made the diagnosis of hydatid mole.

As the uterine wall was very much thinned out in one area and in view of the frequency with which the disease is followed by the development of chorioepithelioma, he removed the uterus and adnexa per vaginam. In this case the ovaries were considerably smaller than normal. Every case of hydatid mole should be observed carefully for months afterward to note whether chorioepithelioma is developing.

DR. MCLEAN said they had examined the specimen for chorioepithelioma, but had not found it.

SEVERE INTRAPERITONEAL HEMORRHAGE OF UNKNOWN
ORIGIN.

DR. A. H. HARRIGAN said that at the last meeting of the Section, Dr. Frank had reported a case under a heading similar to this, but as he had not been present he did not know whether the cases had any points of common interest and similarity. The patient under consideration was thirty-five years of age, whose family history was negative as was also her previous history with the exception that she suffered from periodical attacks of frontal headache which would last for about a week. These attacks had ceased about two years ago. Menstruation had begun at the age of fifteen years, usually lasted four days and was moderate in amount. The onset had been painful until two years ago. For a number of years the patient had noticed a tumor in the lower abdomen which at times increased in size.

Her present illness began on November 12, 1914, when she arose in her usual health and started to leave the house for business. On the way downstairs she fainted. She was carried to bed and a physician called who immediately sent for an ambulance. When the ambulance arrived the ambulance surgeon made a diagnosis of internal hemorrhage. The patient at this time had not recovered consciousness, had vomited several times, was white, pulseless and the picture of internal hemorrhage was complete. An attempt was made to transfer the patient to the ambulance, but it was thought that she was dying and she was returned to bed. Under stimulation, at the end of an hour the pulse could barely be felt. She was then taken to the hospital.

Dr. Harrigan said he saw the patient immediately upon her arrival, when she was in a profound collapse, the radial and temporal pulse being absent. The heart was rapid and respiration shallow and frequent. The abdomen was distended and rigid. A large mass, hard and movable, could be felt in the median line just above the pubes. Bimanual examination showed that it was of pelvic origin, but accurate diagnosis was impossible because of the rigid abdomen and the narrowness of the virgin vagina.

Immediate operation was performed under ether narcosis, the abdomen was opened in the median line and a large amount of pus and blood gushed out. Further examination showed that the entire abdomen was filled with blood. The hemorrhage was indeed extreme. The speaker said he had seen but one other case with so large a hemorrhage and that was a case of rupture of the spleen. The pelvic tumor was a uterine fibromyoma of a fair size, with several subperitoneal growths. The tumor was full of adhesions or attachments, and inspection failed to show any cause for the hemorrhage.

A detailed examination was made of the abdominal viscera, even the stomach and the spleen, the pancreas, etc. Nothing was found which would explain the bleeding. A supravaginal hysterectomy was done, which, in the author's opinion, was an error of judgment. The abdomen was closed without drainage. During the operation the patient received an infusion. The postoperative course was uneventful. The patient was discharged December 13, 1914, and is now in perfect health.

The pathologist's report showed the tumor to be a fibromyoma. Both ovaries showed sclerosis and cyst formation. The tubes showed slight congestion and slight increase in connective tissue.

DISCUSSION ON DR. HARRIGAN'S REPORT.

DR. LEROY BROWN said a case which he had reported occurred about two years ago in a woman thirty-eight years of age, whom he was called to see in consultation. It was thought that she had a ruptured extrauterine pregnancy. When he saw the patient she was practically pulseless, the abdomen was flat on percussion to one-half a hand's breadth above the umbilicus. The face appeared blanched and drawn. She was removed to the hospital and when she arrived the radial pulse was barely perceptible. She was operated upon a week later for a fibroid, which they had suspected at the time of the hemorrhage, but of which they were not sure on account of the large amount of blood in the abdomen. On opening the abdomen they found that the hemorrhage had been very extensive. There was about a quart of old blood in the abdomen and clots were found even up to the kidneys. The source of the hemorrhage was not found, and, at the instigation of the house staff, Dr. Brown said he continued to search for it, but without success. Pressure on the mesentery of the appendix caused some dilatation of the vessels, but did not cause the hemorrhage. There were no varicose veins.

DR. VINEBERG thought it was probable that the hemorrhage came from some small vessel on the surface of the fibroid and said that in women with large fibroids the veins of the broad ligaments were sometimes varicosed and might be the source of hemorrhage. He had had a case in which there was no suspicion of peritoneal hemorrhage, but at operation there was a large amount of blood in the pelvis. He did not investigate the source as extensively as Dr. Harrigan had done, but had no doubt but that the bleeding came from some veins enlarged and varicosed at the base of the right broad ligament.

CESAREAN SECTION WITH HYSTERECTOMY FOR FIBROID UTERUS AND CONTRACTED PELVIS.

DR. GEORGE L. BRODHEAD reported this case, which occurred in a primipara, twenty-eight years of age, whom he saw first in September, 1914, when she was four months pregnant. She gave a normal menstrual history up to her last menstruation, May 15-18. The fundus was two fingers above the navel; the external pelvic measurements were normal, but the outlet was moderately contracted. Six weeks later the fundus appeared to be at the seventh month, although the patient supposed herself to be only $5\frac{1}{2}$ months pregnant. At this time a hard mass, the size of a half orange felt in the lower quadrant of the uterus, two fingers below the navel and a diagnosis of fibroid was made. The patient passed through her pregnancy uneventfully, the tumor growing larger, until at term it was the size of a half grapefruit.

On March 1, 1915, the patient was examined under anesthesia, and the pelvis was found to be too small to allow the birth of the full-term child.

Cesarean section was performed, and a female child weighing 7 pounds was extracted in good condition. There was no possibility of removing the fibroid so a supravaginal hysterectomy was done. The patient made an uneventful recovery and left the hospital with her baby three weeks after the operation.

CESAREAN SECTION FOR CONTRACTED PELVIS AND DOUBLE MULTICULAR OVARIAN CYSTS.

DR. GEORGE L. BRODHEAD reported this case, which occurred in a patient twenty-five years of age, who had been married five years and had had no miscarriages. She had been confined three years before, the membranes having ruptured twenty-four hours before the onset of labor; the pains continued for several days and she was finally delivered of a 9-pound stillborn child. The patient was first seen by the speaker in March, 1913, when she was two months pregnant, and was exceedingly anxious for a living child. The pelvic measurements were normal but the outlet was slightly contracted. The pregnancy was uneventful until the eighth month, when, upon examination, the position of the fetus was found to be left occipito-anterior, with the head above the brim, and in Douglas' pouch was felt a tumor which resembled an ovarian cyst. The patient was advised to assume the knee-chest posture several times daily in order to facilitate the replacement of the tumor. Two weeks later an unsuccessful attempt was made to replace the tumor under anesthesia. The patient consented to have a Cesarean section at term. The operation as performed on October 22, and a child weighing $8\frac{1}{4}$ pounds was extracted in good condition. The right ovary was found to be the seat of a multilocular cyst the size of two lemons, and was crowded down in the culdesac. This was removed; the left ovary presenting the same appearance was also removed, and the abdomen was

closed. The patient made an uneventful recovery, leaving the hospital with her child three weeks later.

The patient was told that while subsequent pregnancy was possible there was only the remotest chance of conception.

In March, 1914, there was a menstrual period, and on September 1, 1914, the patient declared she felt life. Pregnancy proceeded uneventfully and on January 8, 1915, a second Cesarean section was performed at term. The patient was sterilized at her earnest request and that of her husband.

During the operation a corpus luteum was seen, but there was no other evidence of ovarian tissue.

This case illustrated the very great importance of conserving even a small amount of ovarian tissue, though, Dr. Brodhead said he assumed no credit in this instance, as he thought a complete oophorectomy had been done.

DR. GEORGE W. KOSMAK said he was interested in these two cases because he had had a similar one about a year ago, in which the patient had a large fibroid, about the size of a child's head, which blocked the pelvic outlet. He did a Cesarean section and a hysterectomy. The advisability of removing these growths when they complicated pregnancy had been questioned since they were known to subside rapidly after labor, but he felt that it was not wise to leave that fibroid, since they were so apt to undergo degeneration, which might lead to abscess formation or to malignancy.

In another case that came under his observation, the growth was not removed and at the end of three months the woman was not in as good condition; it seemed that one could not always rely on the subsequent retrogression of a fibroid, and the possibility of a future pregnancy did not counterbalance the risk of allowing the fibroid to remain in the uterus. Her symptoms finally called for interference and a laparotomy disclosed a sloughing fibroid mass at the fundus. The uterus was removed.

DR. JOHN O. POLAK said he did not want to let this matter pass without giving due weight to the fact that fibroids apparently obstructing labor, in a large number of cases would take care of themselves, and that even large fibroids rapidly underwent involution and some submucous polyps were delivered by uterine contraction and discharged during the puerperium. As to the cases in which the fibroid blocks the passage and is incarcerated in the true pelvis, Dr. Polak said he had had two such cases, in which before labor it seemed best to do a Cesarean section. One of these patients was seen at home and believing that a Cesarean section would be necessary he sent her to the hospital. What really occurred was that the fibroid was drawn upward out of the pelvis and delivery took place normally. In the other case all the staff thought that without question a Cesarean section would have to be performed, but this fibroid was also drawn out of the pelvis and the labor was normal. Since seeing these cases he had grown more conservative and believed that many of these cases would take care of themselves if given the test of labor. Sometimes the location of the fibroid might interfere

with the delivery of the placenta and it might then be necessary to interfere surgically.

DR. BRODHEAD, in closing the discussion, said that Dr. Polak's remark as to the advisability of giving such cases the test of labor was perfectly justifiable, but in this case he had made the examination and found the pelvic outlet too small. He quite agreed with Dr. Polak that many of these cases if given the test of labor, were able to deliver themselves or could be delivered by force.

He also agreed with Dr. Kosmak that in the case reported, the woman was entitled to hysterectomy, but in the second case the ovaries were cystic and he had removed them, seeing no reason for taking out the uterus. Now he was glad he had left the uterus as the woman had another child.

DR. R. M. BEACH presented a report on

AMERICAN STATISTICS ON SCOPOLAMIN-MORPHINE NARCOSIS; REPORT OF 1,000 CASES OF LABOR.*

DISCUSSION.

DR. GEORGE L. BRODHEAD said that the results of the scopolamin-morphine narcosis at the Harlem Hospital had been very satisfactory since they had discontinued the Siegel method. They were now using $\frac{1}{200}$ of a grain of scopolamin with morphine gr. $\frac{1}{8}$ as the initial dose, and giving a second dose of $\frac{1}{200}$ of a grain at the end of an hour, and subsequent doses of $\frac{1}{400}$ of a grain every one to four hours. They had had a series of 110 cases and in only three instances was it necessary to use restraint, and restraint might have been required in some of the cases had twilight sleep not been used.

Dr. Brodhead asked Dr. Beach what dosage they had used and whether they made a routine practice of getting the patients up on the third day. He also asked if the fetal heart was observed as often as it was believed by some to be necessary. Why should it be necessary to watch the fetal heart so carefully if, as the figures show, there was a lessened infant mortality with the use of the twilight sleep?

DR. J. O. POLAK said that he quite agreed with Dr. Beach's statement that the twilight sleep was making better obstetricians. It might not be necessary from the standpoint of the twilight sleep to watch the fetal heart so closely as had frequently been recommended, but it was a good habit to get into, entirely aside from its bearing on twilight sleep; it had resulted in saving more babies and the discovery of more umbilical souffles which showed babies with cords around their necks and the saving of their lives than ever would have happened had it not been for the twilight sleep. Careful watching of the fetal heart was a good habit whether twilight sleep was used or not.

DR. VINEBERG said that he had no desire to cast any reflection on the figures that they had just listened to, but in one series of 100

* For original article see page 727, Vol. LXXI, No. 5.

cases which had come to his attention there were four deaths of the babies directly attributed to the *Dämmerschlaf*, and these could not have been included in Dr. Beach's statistics.

It seemed to him that Dr. Beach cast some reflection on the figures himself when he said that children thrived better during the first week after birth with the *Dämmerschlaf*. It might be granted that the women did not suffer so much from labor but still they did not nourish the infants until three or four days after, so it did not seem that the use of the procedure could have much effect in this respect on the babies. It was certainly interesting to contrast the statistics which were presented with practically no deaths with the series referred to above in which there were four deaths attributable to the *Dämmerschlaf* after every other possible cause of death had been excluded.

DR. KOSMAK said it seemed to him that in view of the great popularity of the "twilight sleep" throughout the country that any one who felt inclined to cast any reflections on the method must be a little backward in coming forward. That there were certain limitations to the general employment of twilight sleep they had been prone to forget in presenting the subject to the public; both the profession and the laity had swallowed the possibilities held out by this method, hook, bait, and sinker. Owing to the representations by the newspapers and magazines the impression had gone abroad that every confinement case was suitable for the twilight sleep, that all a woman had to do was to go to the hospital, leave her clothing to be sterilized, go to bed and to sleep, and wake up the next morning with her baby beside her. In view of all this it seemed that they should make somewhat more public the facts in relation to the limitations of twilight sleep. As the matter stands now, when a physician refused to give a patient twilight sleep it cast some reflection on his professional ability and he was accused of not knowing how to apply the method. In talking recently with a prominent settlement worker, Dr. Kosmak was informed that many of the women with whom she came in contact did not want the twilight sleep and hesitated to go to institutions where they believed it was employed as a routine proceeding. One patient of his in speaking of the possibility of having another baby, said she had been talking the matter over with a friend and they had come to the conclusion that it would be better to wait a while, as the 'twilight sleep was not perfect as yet and it would be better to wait until it was.' Those using the twilight sleep ought to make public the facts with reference to its various limitations; the profession itself has been at fault in this matter.

DR. ABRAHAM J. RONGY said that the proper presentation of the subject would not do any harm, but that the misrepresentation was harmful. Physicians had permitted the impression to go out that twilight sleep meant painless labor. This is not true. There is no loss of consciousness at any time. It is only a question of reducing or minimizing the pain, but pain is always present in all cases. What actually takes place is amnesia, that is the forgetful-

ness of pain. Patients who have had twilight sleep and have no recollection of the pain after they have given birth, conclude that labor must have been painless, but as a matter of fact the attending physician and nurse watching the pains come and go know that such is not the case.

This very patient is quite surprised when she is informed by her physician on the following day that she suffered pain but the only thing that this drug actually accomplished was forgetfulness of the same. The sooner the medical profession succeeds in impressing the laity that twilight sleep is not synonymous with painless labor, the better the reputation of the method will be. It seems to me from my observations in a great number of cases that the treatment depends more for its success upon amnesia than analgesia.

Dr. Rongy did not think the 1000 cases Dr. Beach had used for comparison furnished the proper criterion. The 1000 cases quoted from the Brooklyn Jewish Hospital wards were usually attended and watched by members of the House Staff while the 1000 cases of twilight were in the main conducted by and watched by the attending obstetricians of the various hospitals. Naturally, one would expect better results in cases which have been so carefully watched by attending obstetricians.

In their series were 16 per cent. of babies who were born oligopneic and had to be resuscitated.

When a method produces 16 per cent. of oligopneic babies one has to be careful how it is used. Furthermore, the labor conducted with twilight sleep was not as aseptic and antiseptic as without it. He wished again to make it emphatic that everyone should try to correct the impression that twilight sleep meant an absolutely painless labor.

DR. R. M. BEACH said he did not go into the details with reference to the 1000 cases used for comparison, but that Dr. Rongy was wrong in assuming that they had not had equally good care and were in all respects suitable for the comparison.

With reference to the dosage, they had individualized every case, studied each case and based the dosage upon indications in that case. They had used the Siegel method at first and found that they had numerous cases of oligopnea. The first twenty-five cases that he had seen made him very skeptical of the method; then they began to reduce the dosage, secured greater quiet, made the room darker, put cotton in the ears of the patient and bandaged her eyes. They gave $\frac{1}{200}$ of a grain for the first dose and the same for the second or possibly only $\frac{1}{400}$.

He did not believe in early rising, although some women could get up on the sixth or seventh day with safety. The twilight sleep made no difference whatever in the getting up; the time of getting up depended on the degree of involution and the amount of laceration.

As to the question of watching the fetal heart, Dr. Polak had observed that the habit of watching the fetal heart made better obstetricians and if twilight did this it was better than the old way. What had been said about watching the twilight patients closer

than the others in the series used for comparison was not true, and moreover the twilight patients had no headache afterward and were in better physical and mental condition than the others

RETAINED AND ADHERENT PLACENTÆ; THEIR MANAGEMENT.

DR. JOHN O. POLAK said that several fatal cases of supposed adherent placenta, seen in consultation, in which attempts at manual removal had been made, was his excuse for presenting this preliminary note on the management of retained and adherent placenta. Retention of the placenta and adhesion of the placenta were distinct conditions which were often confused in the mind of the practitioner to the cost of the patient. Retained placenta was of not infrequent occurrence, while adhesion of the placenta was extremely rare. Errors in the management of the third stage of labor were probably due to a misunderstanding of the physiological processes involved in the placental stage. During the third stage of labor three distinct physiological events took place. These were: First, separation of the placenta; second, expulsion of the placenta; and third retraction of the uterus. Ordinarily the placenta was separated from its uterine attachment in the meshy layer of the decidua, by the sudden contraction and consequent diminution in area of the placental site, due to the retraction of the uterus, which took place after the expulsion of the fetus and liquor amnii. The placenta followed the contraction of the placental site until the villi were approximated and the lacunæ obliterated and it became a solid mass. When it could no longer follow the retraction of the uterus it sprung off at its central portion, irregularly tearing the blood-vessels, which allowed a retraction blood clot to form in the intervals between contractions. This retroplacental blood clot spread out in the form of a fluid wedge, which with each contraction separated more and more of the placenta, the separation extending gradually toward the periphery. This blood was retained normally behind the placenta making the placental circumference the most firmly attached portion, except in low or apical implantations. With each succeeding relaxation of the uterus more blood collected and with each contraction this clot acted as a fluid wedge further separating it from the uterine wall. After the placenta was completely separated, its expulsion was effected by the expelling forces of the uterine contractions, which delivered it to the dilated pouch of the lower segment and cervical canal. The walls of this portion of the birth canal were so flaccid from pressure paralysis that the placenta might be retained in the lower uterine segment for hours, unless the intraabdominal pressure was increased by the bearing down of the mother or pressure was made in the axis of the birth canal by the attendant. Retraction of the uterine muscle closed the sinuses, the muscle bundles crowded closer together, several layers slid over each other so bending and twisting the sinuses on themselves as to choke the blood current. Normal contraction and retraction cooperated to do the actual work of uterine hemostasis. Nature further fortified the healthy woman

against the inevitable loss of blood attendant on the expulsion of the placenta, by increasing the amount of blood during pregnancy and also the proportion of fibrin, while a leucocytosis was present during labor. In view of these facts it was difficult to see how the normal processes could be improved upon, and the writer believed with Ahlfeld that the physiological separation of the placenta was hastened if the uterus was not handled after delivery. He furthermore believed that active intervention, as uterine manipulation favored retention of the placenta and membranes, by interfering with the physiological acts. Massage of the uterus as commonly practised disturbed the normal process and forced the retroplacental blood, before it had time to clot, through the attachment of the membranes at some point, and thus ended nature's process producing a partial detachment of the placenta with incomplete retraction and contraction of the placental site. This allowed uterine bleeding. There should be no vaginal bleeding until separation of the placenta is completed. This event presented clinical evidence in the further expulsion of the cord through the vulva, rising of the fundus in the abdomen, flattening of the uterus from before backward, coincident with a flow of vaginal hemorrhage. It was the author's belief that the Credé manipulation should never be used except to express an already separated placenta. He also took issue with the teaching that if the placenta was not delivered spontaneously, or by Credé, that manual extraction was demanded, because the introduction of the hand into the uterus exposed the woman to the most potent source of infection, namely, the direct introduction of organisms into the open sinuses of the placental site. Retention of the separated placenta in the uterus above the internal os might be effected by the injudicious employment of pituitary extract in the second stage of labor, or the use of ergot as a routine after the child was born, or in protracted labor with the formation of a retraction ring. Many of his consultation cases had been due to these causes. A partially detached placenta was usually the result of untimely attempts at expression by Credé. In this condition the woman would bleed continuously until the separation was completed and complete detachment which was imperative could not be obtained unless the hand was introduced.

Adhesion of the placenta to the uterine wall, while extremely rare, might occur by penetration of the myometrium by the chorionic villi, and when it occurred presented a serious pathological entity. Many of these women died from hemorrhage and from 7 to 10 per cent. succumbed to sepsis. All the fatal cases had the placenta removed manually and in many instances piecemeal. The great contributory cause to this mortality was the introduction of the hand into the uterus, producing trauma and direct infection. In complete adhesion where there had been no manual or instrumental exploration the placenta might be left in the uterus for several days without ill effect to the patient. The cord should be cut close to the cervix and the case watched. If there was bleeding which needed control the vagina should be firmly packed, but the uterus should not

be entered under any circumstances. After watching in aseptic anticipation for the spontaneous delivery of the retained and separated or adherent placenta, he suggested that under complete surgical anesthesia attempt at expression should be made. This failing thorough tamponade of the pelvis under surgical precautions, not entering the uterus, should be tried. This failing he advised extraperitoneal hysterotomy; if the adhesion was then found to be so great that its removal necessitated digging it out piecemeal, hysterectomy, including excision of the placental site, should be performed.

DISCUSSION OF DR. POLAK'S PAPER.

DR. BRODHEAD was very much interested in Dr. Polak's paper and especially in what he said regarding the management of the third stage of labor. In his own experience he had found that there was more hemorrhage where the uterus was left entirely alone than where it was followed down with the hand on the fundus. Massage was used when the uterus was soft and where there was bleeding. He had seen some of the largest hemorrhages in patients in whom the uterus was not watched. In several cases he had seen as much as a quart of blood lost within the uterus because the uterus had not been properly held.

All were agreed as to the dangers of going up into the uterus to separate an adherent placenta; but from his experience there was little danger from sepsis if the patient was carefully prepared and sterile gloves were worn. The use of anesthesia was desirable also since with it the operation might be more thoroughly performed.

DR. RONGY said it seemed to him there should be some distinction made as to which surface of the uterus the placenta was attached whether to the anterior or the posterior surface. If the placenta was attached to the posterior surface it was not likely to separate so easily. He never went into the uterus unless he had to, but if after four or five hours the placenta did not come away he extracted it. He felt that the average obstetrician would do better by going into the uterus when it became necessary than by doing a hysterotomy, whether extra- or intraperitoneal.

DR. R. M. BEACH had had his attention called to the mismanagement in regard to the delivery of the placenta three years ago. At that time he had a case in which the patient started to bleed when attempts at Credé were made right after the birth of the baby, causing a partial separation of the placenta. The patient's pulse went up to 110, then to 120. He expressed the placenta and at the end of twenty-five minutes the pulse went to 140. The next case of a similar nature he did not express the placenta but waited and at the end of fourteen minutes he got definite signs of separation and the expression was easy. Some claimed that one could not tell when separation of the placenta took place, but if these cases were not interfered with and the fundus uteri left alone one could tell with absolute certainty when the separation took place. The reason they could not say when the separation

took place was because manipulation broke up the placental clot. He never permitted an interne or nurse to massage the uterus because it broke up the retroplacental clot and started bleeding. The fundus uteri should be closely watched but not handled. Ahlfeld had shown by his statistics that there was less loss of blood when there was no interference than when the uterus was massaged. When the placenta did not come away one might try the Credé method after one or two hours. One should not forget to do this with the patient under anesthesia, in case of failure, without the anesthetic.

DR. POLAK, in closing the discussion, said, in reply to Dr. Vineberg's question as to whether he removed the placenta in Cesarean section, that of course he removed it in doing Cesarean section.

In reference to the retained placenta, as soon as it was separated, if the patient could not expel it, they used the Credé method. It was not difficult to tell when the placenta had separated if we watched for the signs of separation, namely, the further expulsion of the cord, the rising of the fundus in the abdomen, the flattening of the uterus from before backward, and the gush of hemorrhage from the vagina. It had been amazing to see the reduction in the number of instances of postpartum hemorrhages that had occurred in their services during the last two years since they had insisted upon the students following this plan. There had also been a great diminution in the number of patients brought into the hospital with retained placenta since they had been following the policy of noninterference as he had suggested. It was certainly a very dangerous procedure for the average obstetrician to get into the uterus. He wished to emphasize the point that many obstetricians failed to make a distinction between adherent and retained placenta, and that the separated but retained placenta could be delivered by the Credé method or manually without going above the internal os. He was satisfied that the placenta might remain in the uterus for five days with safety if there had been no interference via the vagina. In cases where an adherent placenta is torn off piece by piece the patient suffers more trauma and risk of infection than from an open operation, and such an operation is safer than introducing the hand into the uterus through infected passages.

TRANSACTIONS OF THE JOINT SESSION OF THE AMERICAN GYNECOLOGICAL SOCIETY AND THE AMERICAN ASSOCIATION OF GENITOURINARY SURGEONS.

WHITE SULPHUR SPRINGS, WEST VIRGINIA, MAY 18, 19, 20, 1915.

MOOT POINTS IN THE ETIOLOGY OF NONTUBERCULAR RENAL INFECTIONS.

DR. EDWARD L. KEYES, JR., New York City, spoke of non-tubercular renal infections in childhood, and asked what was the actual cause of these infections. One might almost say that every child had many infected wounds, and surely every one had many attacks of colitis. Why did not all of them develop renal infections? And why, above all, did the girls suffer more than the boys? Was it because of the shape of the lumbar recess or because of the length of the urethra? Perhaps it was not unfair to discuss this question with a consideration of the cause of acute suppurative nephritis, focal suppuration, or, to use the more familiar term, which he did not like, multiple infarcts of the kidney. Did this acute parenchymatous suppuration occur as the result of a sudden inroad of bacteria upon a kidney previously normal? He doubted it very much.

The study of his own cases had convinced him that there was preceding chronic infection in most of them. Competent pathologists had informed him that the wedge-shaped lesions, upon which so much emphasis was laid, suggested infection rather from the pelvis of the kidney than from the blood-vessels. The only intelligible explanation of the etiology of acute suppurative nephritis seemed to require not a large dose of bacteria, for that would usually strike both kidneys, but rather a lame kidney; a kidney, the resistance of which was lowered by retention perhaps, by infection, perhaps by both. Now let the dose of bacteria be inflicted upon both kidneys. The lame one would suppurate, while its fellow would not.

Certain other types of cases were spoken of as ascending. Notable among these was the defloration pyelitis. But it was not quite clear why this infection should be considered an ascending one. It seemed to conform much more closely to what was known as urethral chill in the male, namely, acute congestion of a previously infected kidney excited by irritation. It seemed an open question and quite as likely that the renal infection was due to an absorption through the prostate and lower ureter, and excretion of bacteria through the kidney, as that it was a direct infection by lymphatics from bladder to kidney.

Ascending infection of this type was certainly strikingly absent in some instances. A notable example of this he had at present

under observation. The patient came to him some years ago with bladder papillomata. He made no careful bacterial analysis of her urine at that time, but it was not gravely infected. In burning away the bladder tumors he succeeded in infecting her bladder, and giving her an incrustation cystitis. Her urine swarmed with staphylococci and bacilli coli. He had recently rid her of the staphylococci, and thus relieved her bladder of the cystitis by means of local treatment, so that she now showed a pure colon bacillus kidney infection. In this instance, therefore, in spite of a chronic colon pyelonephritis and the constant presence for two years of virulent staphylococci in an incessantly irritated bladder, these latter never ascended to the kidney. Such cases threw considerable doubt on the prevalent conception of ascending infections of the kidneys in any other than the pathological sense, for the pathologist often spoke of an ascending renal infection as one arising from the kidney pelvis. In this sense, doubtless the majority of renal infections were ascending, but not in the ordinary acceptance of the term.

THE ADVANTAGE OF KELLY'S METHOD OF CYSTOSCOPY IN WOMEN.

DR. HIRAM N. VINEBERG, of New York City, said that in view of the marked improvements of electric prism cystoscopes, direct or indirect, the question arose whether Kelly's method had any further field in cystoscopy. The writer contended that it had, and that for the gynecologist in particular it still possessed many advantages over any other method.

In the first place, so many gynecological patients suffered more or less from dysuria and frequent micturition that the gynecologist for the most part must be prepared to examine these patients' bladders himself. Very few gynecologists had the means or the time to become experts in the use of the prism cystoscope, and unless the gynecologist was expert in the method, and had gained a large experience in it, he would frequently be misled by trying to interpret what he saw with the prism cystoscope. It was with the prism cystoscope as with the microscope, to gain accuracy in observation and correctness in interpretation with it, called for entire devotion to that line of work; in other words, it called for specialism. It was not so, at least not nearly to the same degree, with the Kelly method for as soon as one had acquired the art of using the instrument, and this did not take long, the observations were made with naked eye, without the medium of any agent but that of the atmosphere. Thus errors of observation were eliminated and no special art or experience was required to distinguish the slightest changes in any part of the bladder interior.

The simplicity of the method and its absence of any features which might lead to misinterpretation, had often been the means of leading the writer to a correct diagnosis when other men with larger experience in genitourinary diseases had been in error.

In the second place, it occasionally occurred that a condition of the bladder was present that made it impossible to examine the interior of the bladder with a prism cystoscope, requiring as it did a certain amount of clear liquid medium. Take, for instance, a very irritable bladder with extensive tubercular ulcerations, in which the smallest quantity of fluid was immediately ejected with great tenesmus, even with free cocainization of the bladder. In illustration, one case in the writer's experience would suffice.

A highly neurotic girl of eighteen, with a very irritable bladder, due to secondary tubercular cystitis, was sent to him for diagnosis. It had been assumed that the bladder infection was secondary to tuberculosis, but it had not been possible to determine which kidney was affected, or whether they both were, as the patient was entirely free of pain in either kidney region and palpation could not detect any enlargement or tenderness on either side. An unsuccessful attempt had been made on three different occasions, in one of which an hour and a half was consumed by one of the best known genitourinary surgeons in New York City, to obtain a view of the bladder interior or to catheterize the ureters. By cocainizing the bladder and placing the patient in the knee-chest position, the writer could readily, with a small Kelly cystoscope, catheterize both ureters. The collected urine from each ureter showed the right kidney was the one involved and on its removal, it was found to be riddled with tubercular ulcers.

Thirdly, the great majority of bladder disturbances in women were due to a localized cystitis, frequently limited to the trigonal area. These cases would usually resist the ordinary method of treatment and would yield only to a direct application of solutions of nitrate of silver of varying strength. These applications could only effectually be applied through a hollow tube, such as Kelly's cystoscope, and with the patient in the knee-chest posture. In any other posture it was well-nigh impossible to have the field entirely free from urine, and it was known how futile it was to apply solutions of nitrate of silver to an ulcer or to a hyperemic area bathed in urine. Thus, in Kelly's method we had at once a ready means of diagnosis and at the same time a most effectual way of curing the patient. Time and again patients had presented themselves at the writer's office, who, for several months, had been treated with all kinds of drugs internally, and all kinds of bladder irrigations without appreciable relief. At their first visit a cystoscopy with a Kelly tube, in the knee-chest position would be made and catarrhal ulcers or trigonitis would be found. An application with a 10 per cent. solution of nitrate of silver would be made then and there. A week later these patients would return saying they were markedly improved and a few more similar applications made weekly would effect a complete cure.

Fourthly, the removal of foreign bodies and small growths could be more easily accomplished through the Kelly tube and with simpler instruments than through any other form of cystoscope.

To sum up, Kelly's method of cystoscopy was so easily learned

and so free from errors in interpretation that it formed the method par excellence for the gynecologist, who had neither the time nor the vast experience necessary to become an adept in the use of the prism cystoscope. Further, in addition to being an easy method of diagnosis, it formed at the same time a ready means of making topical applications directly to the diseased areas and for the removal of foreign bodies and small growths.

SOME ERRORS IN THE DIAGNOSIS OF RENAL INFECTIONS.

DR. ARTHUR L. CHUTE, of Boston, said the greatest cause for errors in the diagnosis of renal infections was a lack of appreciation on the part of the general practitioner, under whose care these cases came first, of the conditions under which renal infection gave pain, and the sort of pain that such an infection usually produced.

This lack of the sort of pain that was supposed to indicate kidney disturbance and the lack of renal casts were often associated with frequency and urgency of urination that pointed to an acute infection of the bladder, and acute cystitis was considered sufficient in the opinion of many men to account for the pyuria and the possible elevation of temperature that the case showed. The accounting for an elevation of temperature by a cystitis was a very common error. It had been his experience that one rarely saw any appreciable elevation of temperature with a cystitis, and that urinary suppuration which was attended with any real elevation of temperature, was almost invariably renal in origin, although elevation of temperature might be seen in those instances where a cystitis was accompanied by a prostatitis or vesiculitis. In women, he believed, any urinary infection accompanied with temperature could be referred to the kidneys.

Errors in the diagnosis of renal infection were due almost entirely to the fact that the possibility was not brought to the mind of the man who saw the patient originally, and therefore accurate measures for diagnosis were not applied.

There was another class of cases in which the error arose from the fact that, though the chance was afforded, we were unable for one reason or another to apply our accurate diagnostic means.

There were other cases where error in the diagnosis of a renal infection was due to the fact that the conditions seemed so evident that the application of the exact means did not seem necessary or worth while. This condition, perhaps, was most strikingly exemplified in cases where the compensatorily hypertrophied kidney was taken out, in cases of one-sided renal tuberculosis. No matter what the immediate reason, the underlying cause for errors in diagnosis for renal infection was the fact that for some reason, avoidable or unavoidable, the methods of exact diagnosis had not been used.

The commonest errors occurred in the cases that were either unattended with pain or in which, if they presented pain, it was referred to the bladder. The importance of these errors depended upon the type of infection in the first instance, and also upon its

intensity. Thus, the ordinary pyelitis due to the common pyogenic organisms was usually considered a cystitis and during the acute stage he was inclined to think that perhaps it was just as well it was not recognized, lest there might be an unfortunate attempt to treat it surgically. Ordinarily it was only in cases where the process became chronic and a careful examination was made that the condition was recognized.

A single woman, aged thirty-two years, seen some months ago, illustrated well the bladder symptoms of renal tuberculosis. The patient fell, some four or five months before he saw her, striking the abdomen over the general region of the bladder. She began shortly afterward to have frequent and painful urination, at times passing a bloody urine. She had a good deal of treatment for her bladder, including a month's stay in a hospital with daily bladder irrigations, but had no relief. When seen by the author her bladder was decidedly intolerant. Her urine showed pus and tubercle bacilli. There was redness about her right ureter; her left ureter was catheterized and gave a normal urine. There was difficulty in catheterizing her right ureter, and so that attempt was not persisted in as it was evident, even without the slightly enlarged, slightly tender right kidney which could be felt on palpation, that the signs of infection came from her right side. A typical tuberculous kidney was removed through a lumbar incision and four months later the patient had gained thirty pounds in weight and was free from her frequency except when she was very tired. Her bladder still showed a somewhat abnormal condition which was steadily improving.

Other renal infections might be confused with certain painful nonsurgical conditions of the intestinal tract, as was a case of slightly infected hydronephrosis that he saw in a woman of sixty some two or three years ago. She had had attacks of acute abdominal pain since she was a little girl. These had been considered various things, and she had been given all sorts of treatment, often with temporary benefit, but with no lasting relief. A little while before he saw her she had passed bloody urine on one or two occasions. He found an intermittent hydronephrosis on her right, mildly infected. The removal of her right kidney, which was little more than a shell, did away at once with her pain, and more than two years after operation she had had no recurrence of her symptoms.

DISCUSSION ON THE PAPERS OF DRS. KEYES, CHUTE AND VINEBERG.

DR. HUGH CABOT, of Boston, called attention to a work upon renal infections in tuberculosis in cattle published some years ago. By watching the slow development of tuberculosis of the kidney it was pretty clearly demonstrated that any case of renal tuberculosis was an excretory affair. In other words, if the tubercle bacillus came to the kidney, as a rule, it was excreted satisfactorily; the bacilli were excreted by the urine without damaging the kidney. Under certain conditions, perhaps of lowered vitality, the bacilli coming to the kidney, passed through the glomeruli as usual and

stuck in the convoluted tubules. At that point in the kidney where the resistance of the cells was lower than in the glomeruli, they remained there, formed a lesion, and from that grew the caseous nodules which occurred in the kidney. Recent work seemed to show that that same principle could be applied broadcast to all renal infections, and he was coming to believe that the various lesions which were observed in the kidney, apparently of quite different types, were in fact nothing but lesions produced by different organisms.

DR. N. SPROAT HEANEY, of Chicago, had had two cases that were quite unusual, where early in pregnancy the patients had a very severe ptomaine poisoning and later pyelitis developed. The urine in both of these cases was submitted to Dr. Geo. F. Dick, of the Memorial Institute for Infectious Diseases, who was much interested in the bacteriology of the urine, and in one case Gaertner's bacillus was cultivated. This patient was the wife of a physician and was in a severe epidemic of ptomaine poisoning some two or three years ago, at which time the organism producing the epidemic was ascertained to be the Gaertner's bacillus, and in this case, five months later, the same organism was cultivated from the urine and was the cause of the pyelitis.

The second case, which was similar to the first, was related.

DR. RICHARD F. O'NEIL, of Boston, had not had any experience with the Kelly method of cystoscopy in the very painful, non-distensible bladders and those of small capacity, particularly met with in renal tuberculosis, but he knew in contracted tuberculous bladders he had had considerable success in catheterizing the ureters in these very difficult cases by the employment of spinal anesthesia, which, as most of these patients were young, had in his hands done no harm. Moreover, spinal anesthesia did not interfere with the renal secretion as did a general anesthetic, and there was no danger of starting up a quiescent lung process which was present in many of these tuberculous cases.

DR. THOMAS L. WATKINS, of Chicago, referred to the relation of renal infection, appendicitis and pregnancy. He had had the opportunity of observing a few instances where the appendix had been mistaken and had been removed for pyelitis in pregnancy. It was well to emphasize the frequent occurrence of pyelitis in pregnancy and the great danger of mistaking it for appendicitis. In every case where appendicitis was suspected in a woman who was pregnant, the woman should be carefully examined for a possible infection of the kidney; that the kidney should be carefully examined for tenderness. It was almost invariably the rule that in acute pyelitis the kidney was tender.

DR. JOHN R. CAULK, of St. Louis, Mo., considered Dr. Chute's paper important. An important mission was to impregnate the medical practitioners throughout the land with the idea that all pus, pain and hematuria were not cystitis. If these individuals were investigated carefully and thoroughly, it would be found almost invariably, and particularly in the woman, that the upper

urinary tract was responsible for practically the large majority of bladder infections.

DR. LOUIS FRANK, of Louisville, stated with reference to the use of the cystoscope that, having had an extensive experience and acquaintance with the Kelly cystoscope, and using also the lens instruments, he must say, from observation, that it required just as much practice and experience to use the Kelly cystoscope with any degree of satisfaction as it did instruments of the lens type. With a reflected light, particularly if catheterization was to be carried out, he believed it would require a good deal more practice to do this with the Kelly cystoscope and to do it satisfactorily in every instance than it would with the cystoscopes such as the genitourinary men were in the habit of using.

DR. FRANCIS R. HAGNER, of Washington, D. C., had had two patients that bore out in a measure what Dr. Cabot had said in regard to tuberculosis. He really was a little alarmed when he removed these kidneys and opened them, because the tuberculosis was so slight that it could hardly be made out macroscopically, and yet he was able to find tubercle bacilli in the catheterized specimens. In one of these cases there was a small tuberculous area in one of the papillæ, with the slightest ulceration into the pelvis of the kidney. In another the ulceration was up in one of the calices. There was absolutely no evidence of any tuberculosis at all in the cortical portion of the kidney.

LABORATORY DIAGNOSIS OF CHRONIC INFECTIONS OF THE URINARY TRACT IN WOMEN.

DR. ARTHUR H. CURTIS, of Chicago, stated that chronic infections of the urinary tract could be best diagnosed by one who was actively engaged in clinical work, including cystoscopy, and in laboratory study.

In the study of the bacteriology of the urine by modern cultural methods, anaerobic cultures were essential. The most satisfactory results were obtained with shake cultures in 1 per cent. dextrose-ascites-agar, and with aerobic and anaerobic blood-agar slant cultures.

Some new points in the technic were suggested: 1. In cases with bladder irritability which yielded clear, bacteria free urine, cultures from the traumatized urethral canal or from the introduction of a probe into Skene's ducts might demonstrate the cause of infection. 2. When bacteria were widely scattered or grew with difficulty a mixture of the urinary sediment with blood, followed by making a large number of ascites-blood-agar tubes of high dilution, resulted in conditions favorable for the development and isolation of the bacteria present.

Regarding vaccines, to emphasize a belief which was becoming more firmly rooted as the author's experience increased, autogenous vaccines in infections other than those with bacilli of the colon group were sometimes beneficial, but did not commonly cure the patient. Colon bacillus vaccines, on the other hand, yielded a high percentage

of cures. Failure to obtain results with carefully prepared and administered autogenous colon bacillus vaccines was indicative of trouble greater than a simple infection, notably kidney abscess, stone, retention of urine, or complicating tuberculosis.

The source of even small amounts of pus in the urine should be investigated and not carelessly ascribed to vaginal contamination. Persistent pyuria in the absence of an easy demonstrable bladder lesion was held to be almost invariably due to a kidney disease.

A method of examination for obscure cases of renal tuberculosis was as follows: Provided the lungs were normal, potassium iodid was given for a period of several days. This was followed by the administration of $\frac{1}{10}$ mg. old tuberculin twenty-four to forty-eight hours before examination. Massage of the kidneys several times daily in conjunction with the iodid and tuberculin tests aided in the production of a focal reaction. Finally, liquids were limited to a minimum before collection of specimens with the two-fold object of irritating the kidney through concentration of solids and increasing the number of bacteria in a given quantity of urine. Urine so obtained was examined after centrifugation in a high-power centrifuge, which was held to be vastly superior to those in ordinary use. In the event of negative findings, many specimens were examined. Petroff's cultures and injection of medium-sized guinea-pigs were used in addition.

Although an advocate of functional kidney tests, Dr. Curtis warned against the tendency to lay undue stress on their value at the expense of careful routine examination.

CONCLUSIONS.

1. Chronic infections of the urinary tract could be best diagnosed by one who was actively engaged both in clinical work, including cystoscopy and in laboratory study. Careful correlation of clinical findings and laboratory methods, with extensive modifications in cultural technic to meet individual cases was essential.

2. The source of even small amounts of pus in the urine should be investigated; the place of its formation should be definitely localized through the assistance of ureteral catheterization.

3. Persistent pyuria in the absence of a gross bladder lesion was almost invariably due to kidney disease.

4. In those frequent cases with bladder irritability which yielded clear, bacteria free urine, cultures from the traumatized urethral canal, or from the introduction of a probe into Skene's ducts, might demonstrate the cause of infections. When bacteria were widely scattered or grew with difficulty, a mixture of the urinary sediment with blood, followed by making a large number of ascites-blood-agar tubes, of high dilution, resulted in conditions favorable for the development and isolation of the bacteria present.

5. Experience taught that the chief lesions in urinary tuberculosis were usually renal. In obscure cases laboratory diagnosis was facilitated by the use of potassium iodid, tuberculin, kidney massage,

limitation of liquids, repeated examinations of fresh specimens after high-power centrifugation, Petroff cultures, and injection of a series of medium-sized guinea-pigs.

6. There was seemingly a tendency to lay undue stress on functional urinary tests at the expense of careful routine examination.

ERRORS IN DIAGNOSIS OF RENAL AND URETERAL CALCULUS.

DR. HUGH CABOT, of Boston, pointed out that in a recently undertaken study of 153 cases of stone in the kidney and ureter at the Massachusetts General Hospital, it was noted that twenty-six abdominal operations had been done upon these patients without relief of the symptoms, which were clearly due to the overlooked calculus in kidney or ureter. The appendix was the most frequent sufferer and was removed in ten cases without benefit. What are described as exploratory laparotomies came next in frequency with eight cases. Fixations of a kidney supposed to be movable and producing symptoms followed in order with four. Then came removal of tube and ovaries, unsuccessful search for gall-stones and attempt to remove adhesions which did not exist, stripping of the capsule of the kidney for nephralgia and as a crowning iniquity, suprapubic cystotomy on a normal bladder for a stone which was situated some few feet away.

Since these errors occurred in the hands of reasonably competent surgeons, it was interesting to discover what symptoms led to the false conclusions. In a study of this group of cases it appeared that in twelve, pains in the right lower quadrant constituted what might be called the presenting symptom, the one for which the patient had sought advice and finally came to the hospital. Abdominal pain entirely without colic was the presenting symptom in thirteen, while backache was the chief complaint in eleven. In all this group of thirty-five cases, the pain was never such as to suggest stone in the kidney and could readily have been mistaken for that associated with disease of abdominal viscera. If, therefore, pain was relied upon as important evidence of stone it was likely to be highly misleading.

It was generally believed that such errors could be avoided by the routine examination of the urine and that only in a small proportion of cases would stone in the kidney, producing pain over a considerable period of time, be associated with a normal urine. Upon this point the study was illuminating. In 150 cases in which the urine was carefully examined on more than one occasion there were twenty-one in which the urine was entirely normal, so that in 14 per cent. of the cases reliance could not be placed upon this evidence. It further appeared that the probability of a normal urine was much greater with stone in the ureter than with stone in the kidney. Thus, in the twenty-one cases of normal urine, fifteen were cases of stone in the ureter, and six cases of stone in the kidney. It was, of course, particularly in cases of stone in the right ureter, that the diagnosis of appendicitis was likely to be made.

At present, the author was inclined to lay down the following rules as likely to avoid these errors if carefully followed:

"1. In all cases of abdominal pain of a chronic or recurring type, in cases of backache, lumbar or sacroiliac joint strain and lumbago, careful, repeated examinations of the urine including a microscopic examination of the sediment in all cases whether albumin is present or not, and of a catheter specimen in all female patients, should precede positive diagnosis. In most of these cases in which the symptoms warrant the consideration of operation *x*-ray plates are essential.

2. The evidence presented by the *x*-ray alone is insufficient to warrant operation in most cases of stone in the kidney or ureter. Possibility of error by mistaking other foreign bodies should be excluded by the use of the ureter catheter, stereoscopic plates, injected radiograph or the wax-tipped catheter.

3. In any case in which the symptoms suggest ureteral calculus and a doubtful shadow appears in the *x*-ray plate, if the ureter cannot be catheterized on repeated attempts or the catheter is arrested at the same point on various occasions, the decision for or against operation must be made upon the apparent gravity of the symptoms.

4. In cases with symptoms suggesting stone in the kidney with a normal urine, a negative *x*-ray and an unobstructed ureter, the wax-tipped catheter will not infrequently lead to a correct diagnosis and will be likely to fail only in the cases in which the stone lies in a dilated calix and is, therefore, out of reach of the catheter."

RENAL PAIN; DIAGNOSTIC AND CLINICAL SIGNIFICANCE.

DR. J. BENTLEY SQUIER, of New York, stated that four main pathological conditions were apt to be confounded with renal lesions by reason of the symptom of pain. They were: 1. Coincident disease of the gall-bladder and ducts. 2. Gastroduodenal ulcer syndrome. 3. Appendicitis. 4. Affections of the large intestine.

The anatomical relations of the descending and retroperitoneal portion of the duodenum overlying the pedicle and the under and lower half of the right kidney accounted for some atypical cases of jaundice with gastric irritability found in patients with ptotic kidneys. With these premises one would grant that the study of the diagnostic value of renal pain offered many inherent difficulties. There must be combined with the pain symptom other associated symptoms which were necessary to complete or fill out a diagnostic group. Valuable complements to pains were the presence of pathological products in the urine, nocturnal and diurnal variations in amount, frequency of micturition, with or without tenesmus, nocturia, etc.

Most of the affections of the kidney were in the beginning painless and many of them remained so. It was known that pain as a result of changes in the parenchyma of a glandular organ was extremely rare. As evidence of this we had the various nephritides of the chronic type that did not show pain unless there was a sudden acute congestion associated with a chronic inflammation and capsular changes. In fact, it was almost an accepted dictum that it was

necessary to have stretching or tearing or pressure upon the delimiting capsule of a parenchymatous organ in order to have the production of pain.

In interpreting renal pain three considerations presented themselves: type of pain, original location of pain, and final location of pain and its path of radiation.

Kidney pain was of two general types: 1. True renal pain located in the flank and lumbar region, of dull aching quality, usually of maximum intensity, of constant character and without radiation. 2. Pelvic or ureteral pain, diffusely located from the lumbar region along the iliac crest, of paroxysmal or colicky quality of varying intensity, of intermittent character with radiation through the inguinal region into the scrotum or rectum or onto the thigh.

In order to establish that pain was of nephrogenic origin it must be correlated with some associated findings. When this was completed the clinical picture would catalogue itself into one or other of the following groups or syndromes: pain with pus but without cystitis, suggesting the calculous group; pain with pus, with cystitis suggesting the tuberculous group; pain without pus, without cystitis plus tumor suggesting the hydronephrotic group; pain with blood without pus without cystitis, the neoplastic or essential hemorrhagic group. It was questionable if any inflammatory disease of renal parenchyma *per se*, without enlargement of the kidney or encroachments into the pelvis, was associated with pain. The products of any infection, however, finding an exit into the pelvis might be retained under sufficient pressure to induce ureteral occlusion with typical calculous type of pain.

A peculiarity of true renal pain was that it never became paroxysmal, but was always characterized by dull, constant aching. Stoop-ing was not painful, but local tenderness was found. Percussion with the whole hand, so-called fist percussion (Murphy), or a blow being developed by the ulnar side of the open hand (Thompson) would cause an intense, acute exacerbation of a true renal pain.

The pain of lumbago was very often mistaken for renal pain. It was well to remember that the pain from lumbago was worse in the morning and improved as the day went along. It was a pain that was considerably lessened by movement and active locomotion. Pain of inflammation of the kidney was less after a night's rest and became progressively worse toward evening and with active locomotion. The moment that the lesion involved the renal pelvis and upper ureter there was a distinct tendency to lose the constant, aching quality of true kidney pain and to have paroxysmal and colicky attacks with a marked tendency to radiation; the line of radiation being clinically along the ureter, bladder, and scrotum, but anatomically along the distribution of the iliohypogastric, ilio-inguinal, and genitofemoral nerves.

In pelvic and high ureteral involvement the skin of the scrotum was not painful on pressure, but the deep tissues were. In lower ureteral and adjacent bladder regions the superficial tissues were painful with absence of pain in the deeper tissues.

A point of extreme diagnostic value was that distention of the renal pelvis and upper third of the ureter was associated with urinary frequency, but usually without painful micturition. The development of areas of referred hyperalgesia occurred with intrarenal lesions, while extrarenal lesions, as a rule, gave local pain and absence of referred hyperalgesia.

Backache was erroneously credited to disease of the kidney, but an extended examination of cases of nephritis, acute and chronic, gave no particular evidence of pain referable to kidney trouble.

It was the author's opinion that pain production by renorenal reflex was not a proven entity, and that a more painstaking diagnostic search would reveal a more definite pathological condition responsible for the pain in the supposedly healthy kidney.

DISCUSSION ON THE PAPERS OF DRS. CURTIS, CABOT AND SQUIER.

DR. WILLIAM F. BRAASCH, of Rochester, Minnesota, said it was difficult to distinguish between the pain caused by lesions in the urinary tract and pain in the extraurinary organs. This was particularly true in the diagnosis of lithiasis, where in almost half the cases atypical radiation of pain was found. Not alone were the subjective symptoms unreliable, but the data derived from the urinalysis were also frequently of indefinite value because the urine with stone in the ureter or kidney might be quite normal and a few pus or red blood cells might be present as the result of disease in the lower urinary tract. We were, therefore, dependent upon the radiogram for a diagnosis in the majority of cases in spite of the fact that we were not always accurate in radiographic interpretation.

DR. J. WESLEY BOVÉE, of Washington, D. C., had been very much pleased with the success of the radiologist in the diagnosis of renal and ureteral calculi. This, in connection with the ureteral catheter, he thought, made the diagnosis nearly perfect, but neither alone was absolutely reliable. He had seen cases, for instance, in which the ureteral catheter would not diagnose them, and in which the wax-tipped bougie would not diagnose them on account of their shape. Tubular calculi were not very common, but he had found them. These calculi might be passed by the wax-tipped bougie without making a mark and urine would pass through them. The x-ray would show them.

DR. H. A. FOWLER, of Washington, D. C., in referring to Dr. Cabot's paper, stated that there was a small group of cases in which a positive diagnosis was impossible, because of the absence of a positive x-ray plate and the questionable interpretation of the clinical findings which were obtained upon examination of the urine, the ureteral catheterization, etc. It seemed to him that a confusing group of cases was that referred to as essential hematuria, which he believed were cases of chronic interstitial nephritis of the hemorrhagic type, in which the presence of fresh blood in the urine and the lack of negative x-ray plates placed the practitioner in the position of uncertainty as to the underlying cause, whether one was dealing with this so-called type of essential hematuria or whether one had

a case of stone in which the x-ray failed to show the presence of stone.

DR. JOHN R. CAULK, of St. Louis, Mo., referred to obtaining urine from the female bladder, and said that, since he had been doing the female bladder and kidney work at the Washington University in St. Louis, on five occasions he had found pus and bacteria in the catheterized urine from clean bladders. He had checked this up and found that if he did not swab out the urethra and collect the urine through a catheter in two glasses, the first glass contained pus and bacteria and the second did not. If he found infection in a catheterized specimen it did not necessarily mean disease. He was now attempting to make it a routine in female catheterization to have the urethra swabbed out and the urine drawn in two glasses.

DR. LOUIS E. SCHMIDT, of Chicago, was surprised to hear Dr. Squier say that renal pain was more or less constant and not radiating in character. In the vast majority of instances we could divide conditions into those that were obstructive and those that were nonobstructive in character. There were just as many nonobstructive conditions that produced colicky, radiating pain as there were of the obstructive type. Take, for instance, a case of acute nephritis or acute tuberculosis, or any other condition that would produce an acute congestion of the kidneys; in other words, any intracapsular inflammation or congestion would produce colicky, radiating pains.

DR. FRANCIS R. HAGNER, of Washington, D. C., said it was very important in cases of calculus to do as little destruction to the kidney as possible, and by the use of the injected radiograph (in many instances this would not be necessary), or the x-ray catheter, one was able to locate definitely the calculus and determine its relation to the pelvis, then when the kidney was exposed one could locate the calculus, cut down on it, find it at that point, and remove it with very little traumatism to the kidney structure.

DR. THOMAS J. WATKINS, of Chicago, referred to the collection of urine without contamination. It was very difficult to cleanse the urethral mucous membrane. There was great danger of producing bleeding if one attempted to clean the urethra. So it was better to pass a catheter under a continuous flow of water and thus collect two specimens of urine.

DR. CURTIS, in closing, stated that in securing specimens of urine, if the patient was asleep, he always separated the labia carefully, spread the urethral orifice a little, and touched the parts with alcohol or with iodine. This insured perfect cleanliness. In introducing the catheter he was careful not to touch the terminal 2 inches, either that which went into the bladder or went into the culture tube. This helped in preventing contamination.

He urged in such cases as essential hematuria, instead of cutting down upon a kidney with the ordinary routine findings, that, at first, careful, thorough urine cultures be made, including anaerobic cultures of the urine.

SIGNIFICANCE OF VESICAL SYMPTOMS IN THE DIAGNOSIS OF RENAL CONDITION.

DR. WILLIAM F. BRAASCH, Mayo Clinic, Rochester, Minn., stated that the renal conditions which were most frequently the cause of vesical symptoms were tuberculosis, pyelonephritis and lithiasis.

Although the fact that vesical symptoms usually predominated with renal tuberculosis had been reiterated by many observers, it was unfortunately true that it failed to obtain general recognition. Of the 203 cases of renal tuberculosis which he reported several years ago, 90 per cent. of the patients had vesical symptoms extending over a period of six months, and more than 50 per cent. more than a year. The remainder had vesical symptoms the cause of which remained unrecognized in some instances as long as ten years. Early recognition of the disease not alone improved the prognosis, but, of equal importance, it might prevent the unfortunate deep-seated infection of the bladder which was so difficult to eradicate. As a rule, the vesical symptoms with renal tuberculosis were more severe in the male patient than in the female.

Diffuse infection of the renal parenchyma and pelvis with organisms other than tubercle bacilli and which came under the term of pyelonephritis usually caused a variable degree of infection of the bladder. The resulting cystitis was usually less severe than that which occurred with tuberculosis and consequently the vesical symptoms were less marked. Occasionally, however, the cystitis with a pyelitis might be marked and when accompanied by areas of ulceration was suggestive of ulceration. When the infection was unilateral and the urine from the affected side was grossly purulent, the two conditions might closely resemble each other.

At the time of colic resulting from urinary obstruction by stone in the kidney or ureter, irritability of the bladder and frequency were often predominant symptoms and might be of importance in the differential diagnosis. In fact, the absence of vesical irritability coincident with pain would be a factor in exclusion in the interpretation of a doubtful renal or ureteral shadow. When the stone was lodged in the vesical portion of the ureter, and the pain was localized largely to the bladder and adjacent area, vesical irritation might be persistent. When the pain with low ureteral stone was localized to the suprapubic or low inguinal area, it was usually the result of a localized periureteritis. The impacted stone caused ulceration in the ureteral mucosa and the resultant inflammatory reaction was the origin of constant pain. The radiation of pain with renal lithiasis might be largely referred to the area of the bladder. This was particularly true in children. Recently a little girl of ten came under his observation with symptoms only of severe sudden pain lasting a few minutes, localized entirely to the suprapubic area. In keeping with his policy to radiograph the entire urinary tract in cases of doubtful abdominal pain, a radiogram showed a definite stone in the right kidney, which was removed, with her recovery.

Although a very large proportion of cases of cystitis were the result

of renal infection, it should not be stated that cystitis might not exist as a primary and sole focus of infection in the urinary tract. The author had observed a number of cases of cystitis where careful examination of the urine catheterized from the kidneys, including bacteriological tests, failed to show any evidence of renal infection.

In the differential diagnosis of the various causes of the irritation of the bladder, the influence of adjacent extravescical conditions should be considered. When vesical symptoms resulted from extravescical cause, they were the result of pressure of a tumor, mechanical interference, malignant involvement, or direct extension of an adjacent inflammatory process.

In conclusion, the author urged a careful consideration of all the possible causes of vesical symptoms, including renal infections, ascending infection, local infections, ulceration, and neurosis, and that plastic operations on the pelvic organs should be resorted to in only exceptional instances.

POSTOPERATIVE RENAL INFECTION.

DR. GEORGE GRAY WARD, of New York City, believed that many instances of obscure and apparently unaccountable elevation of temperature, with concomitant symptoms of septic absorption occurring later in the course of a postoperative convalescence, were cases of renal infection, and they were much more frequent than was formerly believed. In the majority of cases these renal infections were of hematogenous origin and were due to the colon bacillus.

In 1906, Brewer first described as a distinct entity a type of acute hematogenous infection of the kidney which was unilateral and characterized by multiple septic infarcts. Since this publication numerous types of cases of this infection had been reported by a number of observers, and further contributions by Brewer, Cobb and others had helped to clarify the subject and enabled us to classify its variations and to aid our understanding of its pathology and symptomatology.

In studying the reports of cases of this disease one was struck with the frequency with which they followed some operative procedures. This was not strange when one remembered the probable causative factors and the mode of infection. The preponderance of evidence, the result of both clinical and experimental research, tended to prove that the large majority of such renal infections were hematogenous in origin, although some cases might be caused by an ascending infection either by way of the periureteral lymphatics or by extension up the lumen of the ureter.

The common association of this disease with operations upon the intestinal tract, as for appendicitis, might account for the frequency of colon bacillus infections. Anything that caused a lowered resistance of the kidney made it a suitable soil for the infection which was constantly passing through it by way of the urine, whenever infection was present in some part of the body. Undoubtedly the pyelitis of pregnancy and the puerperium was but a phase of these cases of kidney infection. The condition of pregnancy predisposed

to the attack on account of the pressure by the gravid uterus on the blood-vessels and ureters, causing an increased congestion and less perfect drainage of the kidneys; and the ever present colon bacillus in the neighborhood of the parturient canal and the frequency of parturient wounds supplied the primary focus of infection.

There were three types of infection depending upon the degree of virulence. They were:

1. Cases which were mild in character, the patients not being severely ill and yielding to the thorough flushing of the kidneys by the ingestion of water, formaldehyd, proper diet and rest.

The virulence naturally varied according to the particular organism, the condition of the kidney, and the general bodily resistance of the patient.

2. Cases in which the kidneys contained numerous septic infarcts, and minute or microscopic foci, which were superficially situated in the cortex of the organ. Decapsulation or incision with drainage usually resulted in recovery.

3. The fulminating type which was characterized by a profound toxemia, and which was rapidly fatal unless a nephrectomy was done. Fortunately this type of the disease was usually unilateral.

In the treatment of mild cases of infection of the kidney the indication for conservatism was not disputable, and in the fulminating type with the presence of abscesses we had no choice but a prompt nephrectomy. But the proper treatment of the second type of the infection could not be so clearly defined. Much depended on the progress of the disease in each individual case, and to decide correctly when to operate and when not to operate, called for the exercise of great care in considering all the factors and sound judgment in weighing their relative value. The general principle governing the line of treatment should be that of conservatism coupled with a sharp watchfulness for signs and symptoms indicating that the point of toleration to toxic absorption had been reached by the patient, the result of lowered resistance caused by the progress of the disease.

At the outset palliative measures such as rest, a simple and unirritating diet, the ingestion of large quantities of pure water, with the employment of urotropin or other urinary antiseptics should be instituted and maintained so long as the resistance of the patient was equal to the task of combating the toxemia. Should the limit of the patient's ability to resist the disease be approached, as shown by the blood count, and a continued high range of temperature and increasing pulse rate, with evident progressive loss of strength, operative interference was indicated.

If operation was necessary, nephrectomy should not be done unless the indications for it, as shown by the appearance of the kidney, were positive. A decapsulation or nephrotomy with drainage was sufficient in many cases as shown by numerous reports, especially in the colon bacillus infections.

Lilienthal was probably the first to do a nephrotomy in a septic kidney. He reported a striking case of bilateral hematogenous infection with recovery following a double nephrotomy, in 1901.

The author reported a case of severe colon bacillus infection which evidently first attacked one kidney and then the other, and in which decapsulation with drainage resulted in a complete recovery.

In conclusion, he called attention to the following points:

1. That postoperative renal infection was more frequent than had been formerly appreciated, owing to its being overlooked on account of the mild character of the infection in many cases, the severe types being comparatively rare.

2. That vesical irritability occurring after operation might be an important precursory sign of renal infection, and therefore should not necessarily be attributed to a cystitis caused by carelessness.

3. That a study of the urine would show the probable type of the disease present, and thus be a guide to the treatment.

4. That a careful study of the pathological condition of the kidney at the operation should be made in order that nephrectomy might be avoided, if possible.

BLADDER FUNCTION AFTER CONFINEMENT AND AFTER GYNECOLOGICAL OPERATIONS.

DR. FREDERICK J. TAUSSIG, of St. Louis, Missouri, said that since 1902, when he published an analysis of 282 postoperative records from the clinic of Professor Wertheim in Vienna with a view to studying urine retention and its results, a considerable literature had accumulated upon this subject.

The present analysis of 157 puerperal and 405 postoperative cases was based largely on material in the service of his colleagues and himself at the City Hospital during the years 1913 and 1914. Accurate bedside notes enabled him to obtain the desired information in almost every instance.

It was found that out of 157 puerperal cases, 6 required catheterization one or more times. This would make 3.8 per cent. as compared with Meixner, who gave 5 per cent., Waldstein, 8 per cent., and Von Winckel as high as 18 per cent. Among the postoperative cases the number requiring catheterization was much larger. It reached 94 out of a total of 405 or 23.3 per cent.

Of the variations in those women who voided urine spontaneously, of the puerperal, 3 voided within $1\frac{1}{2}$ hours after the delivery of the child. The longest interval between delivery and spontaneous micturition was 22 hours. The average of all 151 patients was a trifle over 7 hours. The shorter the labor, the more quickly did the bladder regain its normal function.

Perineal lacerations, on the other hand, did not seem to have any material influence in his series; 58 out of 151 had lacerations sufficient to require one or more sutures, but they showed no delay in voiding or increased proportion of catheterizations. The 87 primiparæ showed but a fraction of a per cent. difference from the 64 multiparæ in the time of those first voiding urine, the figures being 7.2 hours for primiparæ, and 7 hours for multiparæ. The 18 operative deliveries in the series were hardly sufficient in number to justify any

deductions as to time of spontaneous urination. They showed an average time of over 9 hours postpartum. The amount of urine voided was not given in the puerperal cases as a rule.

Normal postoperative cases. The 405 postoperative cases covered almost every variety of gynecological operations. Leaving aside for the present the 94 cases requiring catheterization, the author found that the 311 women who urinated spontaneously, voided urine on an average at the end of 12 hours. The shortest interval after operation was $2\frac{1}{2}$ hours and the longest 33 hours. The amount of urine voided was not always in relation to the time elapsing up to the first urination. The largest amount of urine voided was $29\frac{1}{2}$ ounces.

His 311 cases showed that on an average the first micturition occurred 12 hours after operation, and that the amount voided was 6.9 ounces. A comparison of 30 cases requiring catheterization with 30 cases of spontaneous urination 12 or more hours after operation was then made. The total urine of the catheterized cases was 395 ounces in 463 hours. The total urine of uncatheterized cases was 247 ounces in 466 hours. The total period of time elapsing since operation being practically identical, we could fairly compare the quantities of urine voided in the two groups. On an average 13 ounces was passed on catheterization, while only 8 ounces was passed when the patient voided urine, making approximately 5 ounces of retained urine in those women who voided it. The following history would serve as an illustration.

A round ligament abdominal fixation was done in a woman, 32 years of age, under ether anesthesia. After 15 hours she voided only 3 ounces; 5 hours later, again 3 ounces; in 30 minutes, 2 ounces; in 1 hour, 5 ounces; in 3 hours, 8 ounces; and finally in 2 hours, 16 ounces. Thereafter urination was normal in amount and interval of time. Summarizing, he found 6 ounces voided in the first 20 hours, and 39 ounces in the following 10 hours. Only at the end of 30 hours, therefore, was the bladder function fully reestablished.

Where several operations were done on the same person they were tabulated under each head. In his statistics of 1902 he found that the interposition operation for prolapse and the radical abdominal operation for cancer of the cervix were particularly often followed by urine retention. Subsequent writers had confirmed these findings and the present statistics were also in accord with them.

In his series the influence of anesthesia upon the bladder function could to some degree be studied by comparing the puerperal and postoperative cases. In the puerperal group, where practically no anesthesia was required, the interval up to the first micturition was only about 7 hours, whereas in the postoperative group the interval extended to 12 hours. Of special interest was the comparison of the 88 spinal anesthetics with the 311 ether anesthetics.

The 21 cases of prolonged urine retention (over 3 days) occurred 8 times after the radical cancer operation, 6 times after a perineal plastic, 3 times after prolapse operations, twice after excision of

vulvar carcinoma, and in the remaining instances without explainable cause.

The most difficult problem in urine retention was still that following the radical cancer operation, because in practically every instance catheterization was necessary and often for a period of six or more days. The presence of large numbers of nerve ganglia in the perimetrial tissues of the uteri removed by Wertheim previous to 1902 induced the author at that time to explain the urine retention in these cases on the basis of excision of bladder innervation.

The problem of treatment had, however, thus far proved an almost insurmountable obstacle. None of the ordinary means of stimulating bladder activity had proved successful in this group of cases. Since 1905 he had done thirty-one radical cervical cancer operations, and of this number only two were able to void urine spontaneously. Both were very early cases without involvement of the parametria. Of late he had adopted the use of a retention catheter in spite of the unfavorable reports of Sampson and Hannes. Franz of Berlin strongly recommended its employment. He had preferred not to use the mushroom type as Franz does, but to rely upon the ordinary catheter held in place by adhesive plaster externally. Such a catheter could be readily taken out for an hour or more every day to be resterilized. In this way pressure necrosis was prevented around the sphincter urethræ that so often attended the long use of the mushroom-formed catheter.

While there were all gradations of deficiency in bladder function after confinement and operation, we could for practical purposes divide patients into four groups: 1. Those who showed at such times no appreciable difference from normal micturition. 2. Those who while able to void urine spontaneously did not for a day or two empty their bladders completely. 3. Those who required catheterization one or more times in the first few days, but were then able to void urine without further trouble. 4. Those with prolonged interference of bladder function, who, even when finally able to void urine after several days of catheterization, were able to expel only a part of the bladder contents.

The character of the operation, the form and amount of the anesthetic, the age of the patient, the nervousness of the individual, and the degree of sensitiveness of her bladder mucosa, were all factors that to a greater or less degree came into play in producing urine retention, and the object of the gynecologist should be to regulate his therapy as far as possible in accordance with the probable factors in each case.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Spontaneous and Traumatic Rupture of the Dura Mater in the New-born.—S. F. Maldonado Moreno (*Arch. mens. d'obstet. et de gyn.*, April, 1915) has grouped a large number of observations from the clinic of Zarate of children which died prematurely, for the purpose of demonstrating the frequency of lesions of the dura mater during labor, and of establishing their cause by studying the mechanism that produces them. The specimens have been preserved and carefully examined. The autopsies were on new-born children of all ages from five months, intrauterine life, to term, at various degrees of development, some of them delivered normally and others by operative means. The author has demonstrated by his measurements the existence of weak points in the dura mater that are easy to rupture by pressure during delivery, which he carefully describes. The lesions consist of ruptures of the tentorium and falx cerebri, from linear slits to enormous tears opening the venous sinuses. The gravity of these lesions is in relation to the amount of damage done. The kind of compression that is most likely to produce such tears is lateral. It may begin at any period of labor or be due to obstetrical operations. The special conditions of the fetal skull are added to pressure. The number of labors tabulated was 527. There were forty autopsies, in ten of which there was rupture. Thus there were 25 per cent. of lesions of the tentorium, and 12.5 of the falx cerebri. Causes are contraction of the pelvis, duration of labor and obstetric operations.

Scopolamin-morphine Treatment in Labor.—J. L. Baer (*Jour. A. M. A.*, 1915, lxiv, 1723) presents an analysis of sixty cases. He concludes that the prolongation of labor, the increase in the number of fetal asphyxias, the excessive thirst and intense headaches that are so distressing, the difficult control of patients and avoidance of infection by soiling of the genitals, the more frequent postpartum hemorrhages, the blurred vision, the ghastly deliriums persisting far into the puerperium, the inability to recognize the onset of the second stage unless by risk of more frequent examinations, the masking of early symptoms such as antepartum hemorrhage, rupture of the uterus and even eclampsia, the violence and uncertainty of the whole treatment, the general bad impression given to our patients who are being taught to approach the "horrors of labor" in fear and trembling, constitute so severe an arraignment of this treatment of labor cases that he feels compelled to condemn it, leaving open the question of the merits of a single dose of morphine and scopolamin in those cases in which we have hitherto given morphine and atropin.

In a favorable report of thirty-five cases, W. E. Libby (*Jour. A. M. A.*, 1915, lxiv, 1728) says that for the present it would seem advisable to employ this drug only when there is every indication that the patient will pass through a normal confinement.

Is Pathologic Metabolism in the Parental Organism Responsible for Defective and Monstrous Development of the Offspring? An unusually great variety of monsters were found by E. I. Werber (*Johns Hopk. Hosp. Bull.*, June, 1915) to occur when fundulus eggs were subjected to the action of solutions of butyric acid and acetone. Most of the monsters observed resembled morphologically very much those which have so often been described in human beings. Other toxic substances, found in pathologic conditions of metabolism, have also been tried, but the results obtained so far have not been conclusive and call for further investigation. The hypothesis, that the pathological condition of the embryo or full-term offspring, respectively, may be due to parental pathology, if borne out by positive results of experiments on mammals, may eventually furnish a secure, scientific basis for the etiology of many congenital defects of the sense organs, the central nervous system (responsible for such conditions as hydrocephalus, epilepsy, etc.) and other organs. Some of these defects may pass unnoticed, until the individual is well advanced in life. Furthermore, the effects of an intrauterine or possibly even preuterine poisoning of the embryo or germ cell, respectively, may not always manifest themselves morphologically; but may be slight enough to cause in the organism only certain chemical, unaccompanied by gross morphological, changes. These chemical changes may lead to a gradual deterioration of the chemical make-up of the individual, the effects of which may become fatal at some point of his life. It is not even inconceivable that such a deterioration may be inheritable and thus eventually lead to racial degeneration. Only experiments on mammals would furnish the crucial test of the assumption that defective development is due to intrauterine or preuterine poisoning by metabolic products of the embryo or germ cell, respectively.

Abderhalden Test.—F. H. Falls (*Jour. A. M. A.*, 1915, lxiv, 1898) sums up the present status of this test by saying that it is not a specific and infallible test for the diagnosis of pregnancy, carcinoma or any other condition. A negative reaction in a given case is of great value as speaking against the possibility of pregnancy. A positive reaction must be interpreted as only speaking for the diagnosis of pregnancy, and that only in the absence of a large number of pathologic conditions. The ferments are increased in the blood during pregnancy. As yet, however, no way has been devised of differentiating between these ferments and the ferments mobilized in many pathologic conditions. The test should be done in all cases in which the diagnosis of pregnancy is in doubt, with a full knowledge of its limitations and possible error. It should be regarded as corroborative evidence together with other clinical phenomena.

Nephrectomy during Pregnancy.—Recording a successful case and reviewing thirty-six additional cases in the literature, A. H. Harri-

gan (*Surg., Gyn. and Obst.*, 1915, xx, 657) says that the cardinal clinical points for insistence are that nephrectomy during pregnancy has a comparatively low mortality; that abortion or premature labor occurs but seldom, and that, as a rule, pregnancy proceeds to term without accident or complication.

The Intolerance of a Fibroid Uterus to Twin Pregnancy.—Montuoro (*Ztschr. f. Geburtsh. u. Gynäk.*, Bd. lxxvi, Hft. 3) believes that the conservative view extended to pregnancy in a fibroid uterus do not apply in cases where twin pregnancy is present. His personal experience with three cases warrants his claim that the prognosis is much more serious. This seems to be borne out by the experience of other observers and Montuoro believes that the difference in the behavior of a fibroid uterus in a single or twin pregnancy may be explained by the more rapid growth of the tumor due to the increased circulation. This interferes with the development of the fetus and favors the interruption of pregnancy or it may produce serious pressure symptoms that call for operative interference. Moreover, the rapid distention brought about by the development of two fetuses results in an increased distention of those portions of the uterine wall that are free from fibromata. It would appear advisable, therefore, in this class of cases to induce labor at an early date, followed by complete hysterectomy to avoid the possibility of more serious results.

Icterus Neonatorum Considered as an Infectious Process.—Pfaltzer (*Zeitschr. f. Geburtsh. u. Gynäk.*, Bd. lxxvi, Hft. 3) reports a careful postpartum examination of a case, which seems to confirm the previous assertions of other authors regarding the infectious character of this disease. In all of these a myositis of a severe degree was encountered. A bacteriological examination in the author's case showed that although the bile and the blood from the heart were sterile on culture, smears made from the liver showed the colon bacillus. This was likewise secured from the umbilical wound and from the muscles. Various other cocci were present. The author is not prepared to state definitely to which organism the infection is due in such cases. It is not necessary to distinguish moreover this type from the ordinary cases of icterus in which no such muscular degenerative changes have been found.

The Action of Salvarsan on the Fetus.—Meyer (*Ztschr. f. Geburtsh. u. Gynäk.*, Vol. lxxvii, No. 1) presents an extended clinical and experimental study on the action of this drug on the fetus during the treatment of the mother. Forty-three cases of syphilis during pregnancy are included in this series, of which forty-two gave birth to living children although five died within a few days. In the latter insufficient treatment is believed to have been the result of the failure and it is possible that the combination of salvarsan and mercury treatment is more effective than the use of mercury alone or a combination of the same with the iodides. The author undertakes to demonstrate the manner in which this result was brought about, confirming his observations in the human subject with experiments in rabbits and mice. He found that the arsenic content of the

placenta corresponded with that of the maternal blood circulating in this organ. A placenta which is healthy is not permeable for arsenic. In the presence of a syphilitic involvement of the placenta arsenic can find its way through the same. It is probable, however, that the results in the treatment of congenital syphilis by salvarsan are largely to be ascribed to the primary effect on the maternal disease. All the women in the series to whom salvarsan was given failed to show any after effect. Neither abortion nor hemorrhage occurred after intravenous infusion in a single instance, nor did any fetal deaths result. The prognosis as regards a living child increases with the size of the dose. The minimum effective therapeutic dose consisted of 1.5 grams salvarsan and 0.5 gram salicylate of mercury. All children of syphilitic mothers require specific treatment even in the absence of any clinical or serological signs of the disease.

The Effect of Ovarian Transplantation.—An anonymous writer contributes an article on this subject to the *Ztschr. f. Geburtsh. u. Gynäk.* (Bd. lxxvii, Hft. 1) in which he attempts to solve the following questions: Is it possible to bring about an increase in ovarian function by transplanting an ovary from the offspring to the mother animal? Also how is the calcium content in the blood and in the bones influenced by this increased ovarian function, and finally what is the behavior of the calcium content in control animals in which the ovaries have been extirpated and which are treated with corpus luteum or ovarian extracts? It was found that the results when the ovaries were transplanted between muscles and peritoneum, as well as in the broad ligaments, were more favorable than the transplantation in the muscles or the bone marrow. The transplanted ovaries all undergo some change. Even where they were well preserved the germinal epithelium as well as the contained ova and larger follicles disappeared. Atrophy of the stroma, as well as a diminution of the interstitial glands, was always noted. After the transplantation of ovaries from one animal of a brood to another, a well-marked diminution in the calcium content of the bones results. This is less marked in the transfer from the offspring to the mother. The calcium content of the blood was not changed in the experimental animals by transplantation, castration and injection of ovarian or corpus luteum extract. The blood in the pregnant animals invariably contains the same quantity of calcium and does not show any physiological diminution in the same. The genitals undergo marked hypertrophy in those animals in which a transplantation from a sister has occurred. Hyperemia results from the injection of ovarian substance in the suprarenal bodies. Following castration a well-marked thickening of the cortical layer and a diminished pupillary reaction in a frog resulted. Following transplantation, on the other hand, no changes were noted in the suprarenal bodies and the pupillary reaction remained normal. The author believes that osteomalacia may be regarded as due to a functional disturbance of the organs of internal secretion and that a hyperfunction of the ovary constitutes the most important rôle in the production of osteomalacia.

Induction of Labor by Baumm's Method.—Szenasy (*Gynäk. Rundschau*, Vol. IX, Nos. 9, 10) reports a series of cases in which labor was induced by this method. This procedure, suggested a few years ago by Baumm of Breslau, consists in introducing through the cervix a sterilized animal bladder which is filled with glycerine. Its action depends on the osmosis between the contained glycerine and the fluid in the uterine tissues. As the osmotic coefficient of the glycerine is greater than that of the tissue juices, the diffusion into the elastic bladder will cause the distention of the latter. The irritation of the glycerine also aids in the onset of pains that apparently do not produce any intoxication such as has resulted when glycerine was directly introduced into the uterine cavity. The writer claims for the method that labor pains come on more quickly than with the introduction of bags or bougies and that the cervix is likewise softened more rapidly. Moreover the thin animal bladder is readily introduced through the cervix. Caution is given that the balloon be filled not more than one-half on account of the subsequent distention and to avoid a possible rupture of the same. In order to avoid the possibility of accident the glycerine should be sterilized before use.

Sugar in the Blood and Eclampsia.—Wieden (*Monatschr. f. Geburtsh. u. Gynäk.*, Bd. xli, Hft. 2) has carried out a series of sugar determinations in the blood after the method devised by Bang. Among eight cases of eclampsia thus examined a hyperglycemia could be demonstrated for varying periods although the more severe forms did not show this characteristic. This corresponds with the animal experiments in which experimental hyperglycemia could not be produced in the presence of a diminished vitality and especially with lowered blood pressure. If a favorable prognosis in eclampsia could be based on the presence of a hyperglycemia, this procedure of Bang would afford a prognostic criterion of value. Wieden is unable to present any positive conclusions as to the causes of hyperglycemia in eclampsia. Labor or the delivery of the child does not seem to produce any marked influence on the behavior of the sugar content in the blood. It is not possible to ascribe the hyperglycemia as the result of renal intoxication from an albuminuria. Five cases of albuminuria were examined, in four of these a very transitory and slight hyperglycemia appeared. The same changes in the sugar content of the blood were found as in eclampsia. The author also made some comparative investigations regarding the blood content of the cord and the mother. These were carried out soon after labor in the eclamptic cases. Where hyperglycemia was present a normal sugar content of the fetal blood was shown and no diffusion of the sugar from the maternal blood therefore occurred into that of the fetus. The sugar is therefore developed by the fetal organism itself, or in the placenta and it seems likely that the latter is the site of this formation. It seems reasonable to assume therefore that the placenta is not a simple filter but a biologically highly developed organ.

Treatment of Placenta Previa.—Stratz (*Ztschr. f. Geburtsh. u. Gynäk.*, Bd. lxxvi, Hft. 3) presents his observations based on a series

of 173 personal cases with one maternal and seventy-seven fetal deaths. Among these 110 were delivered by the method of Braxton-Hicks and in the remainder the hemorrhage ceased as soon as the membranes were ruptured. He does not make any distinction between central and low implantations but includes all cases in which placental tissue could be palpated in the cervix. Stratz believes that in general practice the best methods of treating these cases are as follows. Where there is little hemorrhage absolute rest with the administration of narcotics is indicated and in no case should tamponade be employed. Where the hemorrhage is severe a combined version according to the Braxton-Hicks method should be employed, moderate traction being made with the foot and spontaneous delivery of the child to the shoulders be permitted. This may be followed by later extraction. Stratz claims that dilatation with bags is unnecessary if the Braxton-Hicks version is employed in time. Cesarean section is only to be considered when the mother is extremely desirous of having a living child or other complications call for the same. This statement is made notwithstanding the fact that it may be difficult to sacrifice the child where the heart sounds have diminished before the period has arrived in which extraction would be free from danger to the mother. Stratz claims that the greatest danger to the mother may be summed up in the tamponade at the beginning of labor, or to early and forcible extraction at the end.

The Etiology of Icterus Neonatorum.—Heynemann (*Ztschr. f. Geburtsh. u. Gynäk.*, Bd. lxxvi, Hft. 3) in presenting an extended study on this subject from Veit's Clinic distinguishes two classes of cases. The first is brought about by stasis and reabsorption, the second is due to diffusion owing to some disturbance of the liver cells or their function. In the first group may be included the catarrhal icterus resulting from duodenal catarrh, that due to gallstones and other diseases and tumors of the liver, the bile passages and their surroundings. In the second class the bile is not exclusively taken up by the capillaries but apparently delivered into the lymphatics and blood-vessels. In the latter group may be included those cases of icterus associated with infectious diseases and various toxic conditions. In addition to this it is necessary however to distinguish a third group which includes all forms of hemolytic icterus. The latter is associated with diseases distinguished by an extensive disintegration of red cells, the cause of which cannot be demonstrated. This type occurs in diseases of the blood in certain toxemias and internal hemorrhages. It is in the latter group that icterus neonatorum may be placed. The author's experiments are too extensive to be abstracted but he agrees with those investigators who believe that icterus neonatorum is primarily due to an abnormal and incomplete function of the hepatic cells. It would appear as if the increased demands made on the same after labor are not immediately fulfilled and that this is favored by the excess of blood in the liver and the degeneration of the red cells at the same time. The cause of this disintegration is not definitely established but may be due to the increased activity of certain specific cells.

The Diagnosis of Uni- or Bioval Twins Before and During Labor.—Ahlfeld (*Monatschr. f. Geburtsh. u. Gynäk.*, Bd. xli, Hft. 2) calls attention to the method of diagnosing these characteristics in twins before the birth of the second child. Although this is of no practical value in most cases it is a fact of some interest from the scientific side. Only in those cases in which a distinct pulsation in the placenta of the divided cord of the first twin can be elicited is it possible to say that unioval twins have been developed and that a common placenta is present. On the other hand bioval twins may be diagnosed from the fact that after the birth of the first child if the second one presents by the pelvis it will be of a different sex from the first. This is based on the assumption that in a single ovum fetuses of different sexes are never developed.

Experiments in Artificial Impregnation.—Prochownick (*Zentralbl. f. Gynäk.*, March 6, 1915) presents his personal experiences in a series of three groups of cases. He includes malformations in the husband, of which five instances came under his observation; four of these were cases of hypospadias and the other one epispadias. In two of these spermatozoa were absent. In one group of these cases the introduction of a sponge into the vagina soaked with the spermatic fluid and pressed against the cervix resulted in conception in two instances. It failed, however, in another case and in the third the operative restoration of the urethra having failed artificially, insemination according to the method used by Marion Sims was successfully resorted to. In the second class of cases, which came under the author's observation, diminished potency with healthy spermatozoa was noted. In seven instances artificial impregnation was resorted to with only one success. The third class of cases included those in which diseased conditions in the woman were present, such as various inflammatory changes and tumors. In four cases of closed tubes a plastic operation was done without result even where artificial impregnation was resorted to. The writer believes that the most favorable time for the procedure is between the fifteenth and twenty-second day after the beginning of the last period. The technical difficulties are not so great as an avoidance of complicating factors such as nervousness and lack of confidence in the physician.

Action of Extracts of the Placenta.—Guido Colle (*Ann. di ost. e gin.*, April 30, 1915) has made a series of researches as to the effects on the human organism, especially the cardiovascular apparatus, of the extract of placenta. He gives these conclusions: An extract is obtainable from the placenta through indifferent solutions which causes toxic phenomena when introduced into the organism. Injected intravenously it produces a sensible hypercoagulability of the blood; this phenomenon may be reproduced *in vitro*. It has a marked influence on the arterial tension, causing a fall of pressure of varied intensity and duration, which appears to be due to a direct action on the vessel walls, and not to excitation of the vasomotor centers. It affects the heart also causing a stronger systole and lessening of the impulse. In large doses it slows the respiration. It is not affected

by the action of heat; high temperature lessens the activity of the substance but not markedly; hence its effect is due to thermostabile substances. There is little difference between the extract of the placenta of early pregnancy and that obtained at term. The extract of the maternal portion of the placenta is more active than that of the fetal portion. The placental blood possesses the same action as the extract. If the placenta be washed the extract has a stronger effect, especially on the heart. Dilution does not take away the activity of the extract. Within certain limits its effect is in inverse relation to its concentration. The hypotensive principle of the placenta is to be found in the fresh organ; hence those who attribute the effects to decomposition are in error; putrefaction does not increase its effect. The principles that act on the heart are slightly increased by putrefaction, although present in the fresh placenta. In animals there is a certain adaptation to the effects of the poison; finally tolerance to small doses is established. The effects are not always the same. In some, especially males, it has little effect; in others, it is exaggerated, and even small doses cause toxic symptoms. In pregnant animals the effect is less energetic or nil. One should be careful to inject slowly, as rapid injection may cause death. This death is not caused by thrombosis or embolism. All the properties exist in greater or less amount in all placenta. Centrifugation causes no appreciable change in the action of the extract.

Serodiagnosis of Pregnancy with the Method of Colored Substratum.—Mario Ceola (*Ann. di ost. e gin.*, Apr. 30, 1915) says that the studies of Abderhalden have given impulse to the effort to obtain a test for pregnancy. If the scientific value of the serum test is great, its clinical value is less, since it continues positive after the interruption of pregnancy. The two methods of standardizing the test are the optic and the method of dialysis. The first is based on the products of the placental peptones as shown by the polarimeter. The author describes the method of preparation of the placental tissue, and the method of preparing the ematzme solution. The preparation is kept under a stratum of toluol. The blood is taken from a vein of the forearm with a sterile cannula. The serum is kept in a tube beneath a stratum of the coloring matter. Control tubes are made with an equal quantity of substratum and serum. If dissolving ferments are present in the serum the placental tissue is dissolved and diffused into the coloring solution. After six hours the solutions are observed in the thermostat; the test is positive if the solution has a carmine-red color while the control has remained uncolored. The author's experiments were made on several groups of serum: serum of normal and pathological pregnancy, of women at different epochs of the puerperium, and of nongravid women. The author concludes that the reaction with colored substratum has marked value in the serodiagnosis of pregnancy; it is present in the majority of pregnancies either normal or pathological; it appears at the beginning of pregnancy and continues ten days after labor or abortion; it is positive in vesicular mole. It is negative in gynec-

logical affections and in men. It is of value when it appears within six to eight hours after the test is made.

The Stomach in Pregnancy.—Luigi Bacialli (*Ann. di ost. e gin.*, Apr. 3, 1915) has examined fifty women from the first to the ninth month of pregnancy. He finds that there is increased stomach motility especially in the last months of pregnancy. There is a gradual diminution of total acidity and of free hydrochloric acid as pregnancy advances. There is a marked relation between the amount of pepsin and the free HCl.

Par-obstetrical Motility Troubles.—Gautiez and Tissier (*Arch. mens. d'obst. et de gyn.*, May, 1915) cites as one of the motility troubles which often follow pregnancy a tarsalgia which results from relaxation of the plantar arch of the foot. During pregnancy the other troubles cause those of the feet to be little considered by the patient but when she arises from bed she finds locomotion painful. The condition is like the painful flat-foot of adolescents. There is absence of inflammation of the cartilages, of hyperostoses and of arthritis. As the pregnant woman bends backward to balance the weight in the abdomen she treads on the heels instead of the toes. This allows of atrophy of the posterior muscles of the legs. The weight of the body is borne on the calcaneum and this part of the foot becomes fatigued. The short flexors and long accessory flexors are inserted on the calcaneum, hence they are saved and atrophy as well, and thus the arch is relaxed. Also the woman spreads her legs apart and walks on the inside of the foot, the tibia being oblique on the astragalus. The general laxity of the articulation dependent on the demineralization of the system in pregnancy and the variations in the circulation of the lower extremities assist in the relaxation of the arch. When the woman begins to walk naturally again she finds her arches not ready to support her weight. To effect a cure it is simply necessary to raise the inner side of the sole and throw the weight outward, and reeducate the muscles by electricity or massage and by gymnastic exercise of the foot. A second form of trouble is a limping due to relaxation or partial ankylosis of the pubic symphysis. Toxic nephritis or phlebitis may also cause limping. In a case of the author's it was found that the tendon of the rectus abdominis had been stretched or partially ruptured, and to prevent pain the muscles no longer acted to fix the pelvis on the legs. Insufficiency or atrophy of the abdominal muscles may explain difficulty of walking. In nursing women there is a form of carpalgia due to holding the infant. There is pain in the thumb of one or both hands. Repeated lateral flexion causes stretching of the stylo-scaphoid ligament which becomes painful. The external ligament of the wrist, doing abnormal work becomes stretched and painful. The cause of the difficulty is the flaccidity of the muscles. Immobilization for a time gives a cure.

Measures Taken by the French Government to Assist Women Violated by German Soldiers.—Paul Bar (*Arch. mens. d'obst. et de gyn.*, May, 1915) gives a sketch of the methods adopted under existing laws for assisting women violated by German soldiers in the present European war. What the number of these women is we

cannot know, but that they need assistance and that they should not be compelled to bear the whole burden and stigma of a condition to which they did not consent is evident. There are sufficient laws permitting of such assistance, but in this instance it is permitted and ordered that all red tape which would betray the secret of the woman should be set aside, and it should be only necessary for her to substantiate that she was in the area of war at the time of the beginning of her pregnancy. She is given assistance by the State either at home, at a private institution, or at a public charity as she selects. Her expenses for attendance, drugs and maintenance are assumed by the State. After her confinement she is permitted to keep her infant or to abandon it to the care of the State, as she prefers. In either case she is maintained, with the child, or the child is taken care of for her by the State. Most of these cases are taken care of in Paris since they cannot remain at home in the war regions. Physicians are directed to render them assistance and to look to the State for recompense.

Arterial Tension and Blood Viscosity in Pregnancy and Their Relations.—Paul Pellissier (*Arch. mens. d'obst. et de gyn.*, May, 1915) says that the viscosity of the blood indicates the resistance of the blood to the propulsive force of the cardioarterial apparatus, which is measurable by the determinations of maximum and minimum tension of the blood. The author has studied whether labor and the puerperal state modify sensibly the arterial tension and viscosity of the blood. In normal women the arterial tension and viscosity are little modified by pregnancy or labor, only a slight lowering of tension being observed. In albuminurics the lowering of the viscosity coincides with the increase of arterial tension and is the index of kidney block. In the tuberculous the lowered arterial tension and the progressive increase in viscosity of the blood indicate a grave form of the disease. In the normal woman the curve of tension is always irregular at menstruation. After labor there is a brief lowering of tension. In the sick pregnant woman, in albuminuria of pregnancy the amount of tension is a better prognostic index than the amount of albumin present in the urine. In the normal woman the viscosity of the blood is lowered in pregnancy; it is elevated during the expulsive efforts, and during the puerperal state it is increased progressively up to the seventh day. In cases of albuminuric or other edema, viscosity may be lowered or raised. The writer's conclusions are these: In pregnant women with cardiopathies and especially lesions of the mitral valve, involvement of the myocardium is indicated early by the irregularity of the curve of tension, later by the lowering of the maximum tension and raising of the minimum tension. Increase of blood viscosity is caused in these patients as soon as the troubles of the lesser circulation begin. In prolonged vomiting at the beginning of pregnancy lowering of the tension, and increase of the viscosity of the blood make us fear a grave case, for which active therapeutic measures should be instituted at once.

GYNECOLOGY AND ABDOMINAL SURGERY.

Hypertrophies of the Endometrium.—W. S. Gardner (*Jour. A. M. A.*, 1915, lxiv, 1831) states that in the study of the pathologic conditions of the endometrium which are not the results of infection, several are encountered that may be confused with each other or with the normal endometrium or with adenocarcinoma of the body of the uterus. The premenstrual endometrium is the normal form most frequently mistaken for some pathologic state. What appears to happen in extrauterine pregnancy is the continuation of the same action on the endometrium that produces the premenstrual type; the continued action causing an exaggeration of the ordinary type. There is little doubt that these changes are due to the internal secretion of the ovary. In women who have been bleeding and where some marked ovarian lesion is present, the endometrium resembles somewhat the normal premenstrual type, but is easily distinguished from it on superficial examination by the greater regularity of the outline of the glands and the apparent thinning out of the stroma. While the glands are dilated, the epithelial cells lining them are smaller and more regularly distributed than in the premenstrual type, and the decrease in the stroma is only apparent. The true adenoma is characterized by the great increase in the number of glands associated with a moderate increase in the stroma. The glands are lined by a single layer of epithelial cells which have very large nuclei that contain much chromatin. The epithelial cells in the glands of an adenoma are uniform throughout the growth, and present the same general appearance as in the normal uterine glands. No two of the gland spaces in an adenocarcinoma present the same kind of outline. Interstitial hypertrophy of the endometrium much more commonly involves the whole endometrium than does the glandular form. It is characterized by a great increase in the stroma and by very little if any increase in the number of glands. The glands may be so narrow as to resemble those of the postmenstrual endometrium, or they may be much dilated. What is most common is to find narrow and dilated glands irregularly distributed throughout the entire thickness of the endometrium. The epithelium lining them resembles that in the postmenstrual endometrium and retains its regularity of distribution. This type of hypertrophy of the endometrium is not infrequently associated with marked hypertrophy of the uterine walls. The general appearance of the endometrium in retrodisplacement varies with the period of the menstrual cycle, but shows an almost constant increase above the normal of small round cells. The increase is in the scattered round cells and not in the defined groups. The changes found in the endometrium of the retrodisplaced uterus are apparently the result of interference with circulation, due to the position of the uterus, and not caused by an active process. The endometrium associated with uterine fibroids acquires no characteristic appearance.

Ureteral Calculi.—J. T. Geraghty and F. Hinman (*Surg., Gyn. and Obst.*, 1915, xx, 515) say that while radiography is the simplest

and probably the most valuable single diagnostic method for the detection of ureteral calculi, even in the most expert hands, a surprisingly large percentage (22.4 per cent.) may be undetected by it. This large percentage of failures demands the employment of supplementary methods before excluding stone with any degree of positiveness. By means of collargol ureterograms a calculus occasionally will be shown which the simple x-ray failed to reveal. The employment of the wax-tipped catheter is by far the most accurate method for the detection of ureteral calculi, and this method should be in more general use. In six out of thirty-five cases of ureteral calculi (20 per cent.) seen in the last two years, it has located a stone where repeated skiagraphs were uniformly negative. Owing to the great frequency of extraureteral shadows in the region of the pelvic portion of the ureter, diagnosis of ureteral stone in this position cannot be accepted without confirmatory information. A considerable percentage of stones which enter the ureter pass spontaneously, and the discovery of a small calculus is not always an indication for immediate operative interference. Unless the stone is blocking completely or producing repeated and violent colic, simple manipulative methods should first be employed. For calculi beyond the juxtavesical portion, displacement with the ureteral catheter, injection of oil or the securing of relaxation of the ureteral wall by using the thermocatheter may, in certain cases, result in the expulsion of the stone. When the stone is in the vesical portion of the ureter, cystoscopic procedures should usually be successful. A study of the authors' cases, as well as different series reported in the literature, shows that a considerable proportion (14.3 per cent. of the writers' sixty-seven cases; 17 per cent. of 204 cases, Jeanbrau) of ureteral calculi are arrested in the intramural portion of the ureter—a portion which can be readily reached by cystoscopic methods. These methods, therefore, have an increasing field of usefulness.

Use of the Percy Cautery in Carcinoma Uteri.—In a preliminary report, S. M. D. Clark (*Surg., Gyn., and Obst.*, 1915, xx, 558) says that in inoperable or surgically abandoned cases the temporary results are striking. Hemorrhage ceases and with detachment of the slough the stench goes. As the source of toxemia is removed the general condition is greatly improved. In the border-line operative cases, the application of this extensive heat has a most gratifying result, making many operable that otherwise would be declined. Whenever there is a definite ulceration with bleeding, having as a rule an associated local infection with slight infiltration, the Percy cautery should be employed as a preliminary measure, since it not only acts in destroying the infection, but stops bleeding and toxemia and the case will in three weeks be a far better surgical risk than when first seen. To apply the heat properly takes fully thirty minutes in the simpler cases and sometimes as high as fifty minutes in the advanced ones. Therefore it is not well to add to this, an additional hour and a half to two hours, manipulation in performing the radical operation, but it is better to divide the procedure into two sittings. Whereas the heating iron is a valu-

able adjunct in the effort to destroy cancer process, its combination with radical removal will give a greater percentage of permanent cures. In the earliest type of cervical carcinoma, where the patient is a good risk, we should use the heat as a preliminary step. First the abdomen should be opened and the cautery should be introduced within the cervix. The hand should be inserted within the abdomen to ascertain when the heat reaches the point where it can barely be tolerated. If heat to such a temperature is maintained for ten to twenty minutes, all cancer cells so influenced will perish and then when the abdomen is invaded immediately after, there is no danger of grafting cancer cells, at any rate those cancer cells near the uterus and within the vault of the vagina. Since this extra twenty minutes does not overtax a good risk, the radical operation immediately follows the cauterization. The writer's early results in twenty-five cases have been encouraging. He uses an electric heating iron with low-grade heat and avoids carbonizing the parts. He never cures. In extensive proliferating external cancer it is best to use the cutting blade of the cautery. Another point in Percy's plan from which the writer varies is in not routinely opening the abdomen at every heat sitting. In a case having a large, fungating, sloughing mass, this is first destroyed without section; then after the original growth has shriveled and the general condition improved, in about three weeks later, at the second sitting, the abdomen is opened and the heat applied high up within the uterus, using the hand as a guide to the location of the cautery, as well as to the degree of heat.

Urethral Caruncle.—E. L. Young (*Bost. Med. and Surg. Jour.*, 1915, clxxii, 822) has studied all cases of urethral caruncle operated upon at the Massachusetts General Hospital in twenty years. In nineteen cases slides were available. Pathological examination of these tumors shows a surprisingly large percentage (over 25 per cent.) of cases in which the question of malignancy is raised and as there is clinical evidence to show that certain cases turn out carcinomatous later, from the evidence of this report, it would seem wise to examine all specimens when possible and watch carefully those suspicious ones. About 50 per cent. of caruncles have no accompanying symptoms and where urinary symptoms are present a large proportion are probably not due to the growth. Thirty-three per cent. of all cases of this series have recurred regardless of the type of operation and where a stricture has been present it has always recurred.

Ovarian Fibroids.—In the records of the Frauenklinik of the Königliche Charité for over ten years A. M. Hellman (*Surg., Gyn. and Obst.*, 1915, xx, 692) found only six cases of ovarian fibroids, which he reports and analyzes. He says that the etiology of these rare tumors is still obscure and unsettled. The anatomical origin is variable. The symptoms are those of a tumor of the adnexa. Only after the tumor has been sectioned and studied microscopically can one feel sure that it is not a myoma or sarcoma or of epithelial origin. The treatment is operation. The prognosis is good. The tumors can best be classified as fibroma with and without ovarian rests. The

pathology is variable from very small to very large. These tumors are, as a rule, hard and irregular but may be cystic. They may undergo very many forms of degeneration, of which fatty degeneration is probably more common than usually noted. To call a given ovarian tumor a fibroma there must be a definite regularity of the individual fibrous or muscular cells and strands despite all other irregularities. The fibers are as a rule short and spindle shaped; the nucleus is slightly bent or pointed and the protoplasm only slightly surrounds the nucleus.

Abdominal Hysterectomy for Cancer of the Uterus.—A. Maurer (*Rev. de gyn. et de chir.*, August, 1904) has collected 60 cases operated on at the Hôpital Broca, in the service of Pozzi, since 1905, for cancer of the uterus, the specimens of most of them having been carefully examined, and gives the result of his analysis of the results obtained. Of these operations, 30 were for total abdominal hysterectomy; 30 were for enlarged abdominal hysterectomy. As technic has been perfected the scope of the operation has been enlarged, but all were done with isolation of the ureter and ligation of the uterine artery outside of the organ. The total mortality was 17, that is 28.3 per cent. Most of these cases were admitted with the lesion in an advanced stage of development. In the simple cases the results were more favorable than in the late cases. The mortality of the operations by the extended method was less than by the less extensive operation, while the enlarged operation is no more serious than the other. Here we work in healthy tissues and avoid the inoculation with cancer cells. Ligation of the hypogastric artery has real advantages; there is less shock, hemorrhage is absent, and the liberation of the ureter and removal of the parametrium are done more easily. The postoperative accidents are lesions of the ureter, wounds of the bladder, urinary troubles, and rupture of the neoplasm. Of the 60 cases 17 are dead, that is 28.3 per cent. Of 30 total abdominal hysterectomies 8 died; of 30 enlarged operations 9 died. The author offers the following conclusions: The enlarged abdominal hysterectomy is not more serious than the total hysterectomy on account of operating in healthy tissue. The increased length of survival of the patients operated upon by the extended method shows that by it we can attack cases that would be inoperable under other conditions. We can establish a relation between the survival and the histological examination of the growth. The longest survival is in cases in which the cancer is least deep in its infiltration.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS.

THE MENTALLY BACKWARD CHILD FROM THE STAND- POINT OF THE NEUROLOGIST.

BY

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By a mentally or intellectually defective child I mean one who is "far" below the normal standard as accepted by well-established intelligence tests. I say far, because in testing the mentality of a child several factors must be taken into consideration; namely, the personal equation of the examiner, the home environment of the child, hereditary influences and lastly whether the defect is general or only limited to certain tendencies. So that a child found to be one or perhaps two years behind his age according to a certain intelligence test I would hesitate to call defective.

We distinguish three types of mental defects: (1) Idiocy, to which no intelligence test can be applied; (2) imbecility, in which the mentality is on a very low threshold, six years or more below the normal, but to which an intelligence test can be applied and (3) feeble-mindedness, several years below normal standard, but not more than six years.

What are then the concomitant manifestations of backwardness, what are its causative factors and to what extent can it be ameliorated?

Frequently the concomitant manifestations are of a functional nature, such as various types of neuroses or psychoses, but in the vast majority of cases we find organic brain defects. Among the first I would include chorea, habit spasms, neurasthenia, hysteria, essential epilepsy, psychic equivalent, dementia precox and types of manic depressive psychoses. In the latter I would put various types of infantile cerebral palsies with or without epileptiform con-

vulsions, hydrocephalus, micro- or macrocephalus, cerebellar and tabetic ataxias and organic defects of the special sense organs. We may also include here organic defects which, although not limited to the brain proper, are concomitant manifestations of the mentally retarded child. These are the infantile dystrophies and diseased ductless glands, which later give rise to cretinism, infantile myxedema, Mongolian family idiocy, infantilism, Basedow's disease, acromegaly and mixed types.

The etiological factors are generally considered pre- and postnatal. They may arise as a result of trauma, of an infectious process or again the result of an affect; namely, an inherited neuropathic or psychopathic constitution.

The most frequent traumatic influences are delayed labors or instrumental deliveries. These two factors are elicited in fully one-third of my cases and that is in agreement with the reports of most investigators. Other forms of postnatal traumata are by no means uncommon and are present in the histories of cases attended by convulsions. I want to call attention here to psychical trauma such as shock from fright which is a frequent exciting factor in the production of neurosis and even a psychosis on a neuropathic or psychopathic constitution.

Of the infectious agents the exanthemata take the first rank. Cerebrospinal meningitis, poliomyelitis, pneumonia, syphilis and tuberculosis are very often recorded. Diphtheria and various streptococcic infections of the nose and throat and middle ear frequently give rise to meningeal involvement.

Both the traumatic and infectious agents produce inflammatory conditions of the meninges at the base and convexity of the brain. If at the base, some of the cranial nerves become involved and give rise to defects of the special sense organs. Blindness will result when the optic nerves are involved and deafness when the acoustic nerves are involved. Children surviving from basilar meningitis are very often deaf and blind. If the convexity of the brain be involved, we may deal with a hemiplegia, epileptiform convulsions, motor or sensory aphasia, either partial or complete. The ideational faculties may be dulled, or retarded or completely destroyed. In cases where the communicating foramina between the ventricles are partially or completely occluded by inflammatory deposits, an accumulation of an exudate will lead to an internal or external hydrocephalus. If the amount of fluid in the brain is sufficiently large to exert an undue pressure upon the brain cortex, it is perfectly evident that we will get diplegias, convulsions and a very low mentality. Vision

in such cases is always interfered with on account of the pressure exerted upon the optic tract.

Cortical and basilar hemorrhages are frequently produced by traumata. They also lead to depressions of the skull, which press upon the brain cortex. In these localized lesions we get focal symptoms in conformity with the place involved.

In the case of syphilis I make a distinction between infection and affection. In an infection the syphilitic virus, the *Treponema Pallidum*, is inoculated. Such infection of the central nervous system will give rise to cerebral or cerebrospinal syphilis with focal symptoms according to the site involved. Blindness, deafness, convulsions, paralysis, ataxias and even psychoses may result.

By an affection I mean a state of lowered vitality as compared with the normal threshold. This is the result of the chemotactic action of the toxins upon the protoplasm of the brain cells, a pathological change in their normal molecular consistency. Such lowered vitality is inherited by the offspring without the virus producing in it such change. This affection manifests itself in what is commonly known as a neuropathic or psychopathic constitution. Alcohol and tuberculosis as well as syphilis are productive of such conditions. It is an accepted fact that such hereditary taints are transmitted from generation to generation. In progenies of consanguineous marriages, in whom there are such deleterious factors, these deteriorating manifestations are brought out more promptly and certainly. Upon such a neuropathic or psychopathic constitution psychic or physical traumata or infectious diseases will engraft some form of mental deterioration and thereby render the mind decidedly unstable if not exactly insane.

Alcohol, even in small quantities, frequently used, affects the protoplasm, and therefore the entire system. It lessens the absorption of oxygen by the red blood corpuscles and the exhalation of carbon dioxide, thus producing a toxic condition. It not only diminishes the powers of resistance but favors the growth of pathogenic organisms. It also inhibits to a great extent the metabolic changes in every organ of the body.

The decrease or increase of mental disorders and crime are shown by statistics to be in direct proportion to the rise and fall of the consumption of alcoholic beverages.

Since the mother has a greater share in the life and care of the child maternal alcoholism is of far greater danger than the paternal. It was proven again and again that the earlier in her pregnancy a woman takes to drink the more certain will be the debility of her off-

spring. Among others Bourneville made a class study of 2555 children who were classed either as idiots, epileptics or imbeciles, or who suffered from some form of neurosis, and of these he found that 1053 had an inebriate parentage. In 933 it was paternal, in 80, maternal, and in 40 it was traced to both; 235 were conceived during paternal drunkenness.

We may, therefore, conclude that paternal intemperance, if not itself due to a neurotic heredity, and especially if emphasized by disease or privation, certainly produces a marked influence upon nutrition and causes mental and physical degeneration, both in parents and offspring, in other words is productive of a neuropathic or psychopathic constitution.

In tuberculosis we also deal with a toxic condition that ravages the tissues of the parent and produces not only a diminished resistance to the infection but gives rise to imperfect bodily development of the child. It may not be the tubercle bacillus that the surviving offspring inherits, but the so-called tuberculosis diathesis—a degeneration due to a toxemia. Such children show manifestations due to an underdevelopment of various tissues never reaching the norm and thereby also a low threshold of their functions. One notices a subnormal body weight, a positive sign of lack of proper nutrition. The skin is spongy, pale, rather inelastic and yet not tense. The muscles are as a rule flabby and weak, prone to easily fatigue and become exhausted. The swelling of the lymphatic glands is a constant accompaniment. These are constant signs of a scrofulous diathesis and as the children grow older they develop various organic diseases of the viscera and bones characteristic of a faulty nutrition. Hand in hand with that goes a mental backwardness of various degrees from mere retardation to a complete imbecility.

Syphilitic affections, as stated before, do not yield symptoms of an infectious process, but rather of a constitutional inferiority. And yet the fate of such a child may be as dark as that of an infected one. Its general physical development may also be retarded or even markedly inhibited. Ageneses, aplasias of various tissues, especially of the central nervous system, are met with in no rare instances. Dys-trophies are now regarded as due to such aplasias. The cells may possess a weak power of resistance and fatigue rather early in life, succumbing easily to the very onerous tasks required of them in the daily discharge of their functions, unable as it were, to proportionally assimilate new food and replenish energy so easily lost. Many authors also believe that the toxins of the syphilitic virus cause organic changes in the various elements of the central nervous

system, the ganglion cells, their prolongations and the glia cells. The vessels do not escape injury altogether. An obliterating endarteritis or a gummatous periarteritis with consequent areas of softening are not uncommon. Such is the anatomical basis of various juvenile psychosis. Of the most prominent stigmata Hutchinson's teeth and an interstitial keratitis are valuable guides to a syphilitic constitution.

Finally we come to consider the diseases of the ductless glands. The secretions of these glands contain chemical substances which profoundly influence the bodily functions. According to one theory they enhance the assimilation of food and thereby influence growth, and according to another they are supposed to be germicidal and neutralizers of toxins and thus are preventing the toxic destruction of tissues. Whatever theory may prove the correct one, it has been established experimentally and clinically that whenever the balance of these internal secretions is upset by a lesion in any of these glands there result diseases which give rise to definite clinical manifestations. Just as the various organs are influenced in their nutrition and therefore in their growth, so are the functions of the central nervous system profoundly influenced in the same ratio. All children suffering from any defect of the ductless glands are mentally below par. It matters not whether we are dealing with hyperthyroidism, giving rise to the syndrome of Grave's disease, or its antagonist hypothyroidism, resulting in cretinism, infantile myxedema, or again hyperpituitarism with the syndrome of acromegaly or that of hypopituitarism with the symptom-complex of infantilism, imbecility or even idiocy, mental backwardness is a constant manifestation. Of course, the degree of the child's backwardness depends entirely upon the extent of involvement of these glands. The particular etiology of these affections is not definitely known, but many investigators have been able to demonstrate that alcohol, tuberculosis and syphilis do play a considerable rôle in their production. It may not be amiss to state here that enough attention has not been given to the defects of the ductless glands in childhood as a possible etiological factor in the production of a backward mentality. I am inclined to place the onus upon them whenever I am unable to elicit any other factor in the absence of focal symptoms that would point in another direction.

From what I have said before it is evident that the possible amelioration of such conditions may best be accomplished by prophylactic rather than curative measures. It would be impossible to enter

upon an extensive discussion in this paper, but a few general remarks may prove of value.

The education of the public in eugenics is the important phase of prophylaxis, but our public servants must strive to create ideal social conditions. The wage earners, who constitute the great bulk of the social organism, should be given a chance to live in ideal homes as well as to make a fairly comfortable livelihood under ideal conditions, in the factory.

Consanguinity in marriage should be restricted by legislation to a far greater extent than is done by any church or creed. It should be made compulsory for any one applying for a marriage license to undergo a thorough physical examination by expert observers. The Wassermann reaction should be resorted to in every case.

As the production of these unfortunates is not limited to any particular class of society, but are the results of the outcroppings of vicious and defective tendencies in all ranks and classes, including the highest, where the black sheep of the family does not come merely by chance, the avoidance of injudicious matings utterly unfit for the propagation of healthy offsprings is imperative.

In passing I made mention of forceps deliveries and delayed labor as traumatic factors in the production of various conditions attended by mental backwardness. I now desire to call attention to a new fad, the so-called twilight sleep, produced by the obstetrician in the woman during labor with the avowed purpose of ameliorating suffering. The statistics of all clinics, where this method was adopted on a large scale, shows that in all cases without exception, the second stage of labor was delayed from one to three hours and that the percentage of forceps deliveries rose from the normal 4 per cent. to 14 per cent. Let us pause and reflect. Is it not better for the woman to suffer a few hours' pain rather than be exposed to suffer untold agony for many years on account of a physically and mentally crippled offspring that may result from an otherwise unnecessary instrumental interference? Is it economically wise to saddle on the state a child as a nuisance rather than as a precious asset? Discarding many other reasons advanced against the twilight sleep, this one I have stated ought to be sufficient to discard it.

So far as curative measures are concerned, they must be both medical and educational. Hygienic surroundings and proper, nourishing and easily assimilable diet are the most important prerequisites and along with these proper medication as the case may indicate, will, in cases which are still amenable to medical treatment, do a great deal of good. To enter into detail of the various medicaments

would mean to give a comprehensive review of the entire *materia medica*. It may suffice to say that in some instances proper medication will redeem an otherwise lost wreck, especially is this true in syphilitic infections. Alongside of this an individualizing, not specializing, teacher, one with a keen power of observation and fairly well equipped with the knowledge of psychology and anatomy and physiology of the central nervous system, will materially aid in bringing order out of chaos. All this must be attempted early, if success is to be attained, for as the child grows its brain cells adjust themselves to their environment and to begin late would mean to attempt the impossible.

In conclusion I would say that each case must be studied as an entity by itself and we must minister to its particular needs as the case may demand. As to the general prophylactic measures which I have pointed out, I would say that they seem to me to be very simple and not at all costly and if realized by our educators, social workers, physicians and legislators they would find a perplexing problem well in hand.

1215 PARK AVENUE.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Stated Meeting, Held May 13, 1915.

DR. WALTER LESTER CARR *in the Chair*.

PROPHYLACTIC VACCINATION FOR VARICELLA.

DR. SOPHIE RABINOFF in this paper reported her experience with prophylactic vaccination during an epidemic of varicella in the wards of the Hebrew Infant Asylum of New York City. She reviewed the work of Kling of Stockholm and of Handrick, both of whom had found that a definite degree of protection was afforded by vaccination against varicella. While varicella was not in itself a very serious disease, nevertheless in an institution which cared for over 400 children the seriousness and inconvenience of an epidemic and the value of some prophylactic therapy was evident. The chief problem had been to obtain the virus. Animal inoculations had thus far been unsuccessful. The only recourse at the present time seemed to be the contents of the lesions in an active case of varicella. Early in the course of the disease, while the vesicles were clear, some material could be collected in sterile

capillary tubes and transported for use elsewhere. This allowed of an indirect method of vaccinating. However, this was not always feasible, as frequently the vesicles were very small, containing only a minute quantity of the material, and might desiccate rapidly and become pustular, so that it was impossible to obtain virus in capillary tubes. In the majority of instances it was therefore necessary to use material directly and immediately from either the vesicles or the pustules. Of course, the presence of any transmissible disease in the donor must be considered and guarded against, lues, in particular.

The method used at the Hebrew Orphan Asylum was similar to that of Kling, except that instead of multiple punctures small scarifications were made on the arm to be vaccinated. A vesicle in a fresh case of varicella was pierced with a vaccination lancet with which the scarification was carried out. Varicella was one of the most highly contagious diseases, spreading through an institution and allowing few children to escape. This had been well illustrated in the Hebrew Orphan Asylum. In one ward among thirty-eight susceptible children, thirty-two developed varicella. In another ward among twenty-eight susceptible children, twenty-one came down with the disease.

The results of the vaccination were shown by the chart arranged to show the total number vaccinated, excluding those protected by a previous attack, the susceptibles, and the incidence of the disease among both. In the ward containing thirty-eight children in which thirty-two came down with varicella, one vaccinated child happened to have been transferred. It was interesting to note that this child did not take the disease. In another ward containing twenty children who had been vaccinated, although three active cases of chicken-pox occurred in the ward not one of the vaccinated children took the disease. The same striking contrasts were shown in the other wards.

Among the group of 142 susceptible children, 114, or about 75 per cent., developed varicella, while in the group of seventy-six vaccinated children, only six, or about 8 per cent., contracted the disease. Of these six cases two developed on the day following vaccination, two seven days later, one nine, and one ten days later. In other words, all the cases among the vaccinated children developed within the incubation period of the disease, which was about sixteen days.

In this epidemic the vaccination undoubtedly limited the spread of the disease. The duration of this protection could not at the present time be determined. This method of protective therapy could be recommended for employment in similar institutions as well as in selected cases in the home.

DISCUSSION OF DR. RABINOFF'S PAPER.

DR. ALFRED F. HESS said that he could merely reiterate what Dr. Rabinoff had said. Her results spoke for themselves. The

decided difference in the number of children that contracted varicella among those that were vaccinated and those that were unvaccinated was proof that the vaccination did provide some protection. Where two or more children in the same family had been exposed at the same time it was questionable whether vaccination would be of much practical value, since it seemed that vaccination during the incubation period of the disease was not very effective. Where, however, one child of the family was exposed and came down with the disease, prophylactic vaccination would be of great advantage to the others. Although varicella is not a serious disease, it causes great inconvenience both in the home and in institutions due to the long period of quarantine which it necessitates. These vaccinations have been necessarily discontinued at the asylum at present, due to the cessation of the epidemic. However, Dr. Hess proposes to make use of this therapy again on his service should chicken-pox make its appearance at some subsequent time.

DR. WILLIAM H. PARK said he wondered if Dr. Rabinoff knew how long the virus could be preserved at low temperatures and whether it could be preserved at freezing temperatures for long periods as vaccine virus, and also whether she had been able to obtain enough from vaccinated persons to use for purposes of propagation. A third point that he would like to know about was whether she had observed whether the virus was more abundant in the epithelium at the base of the vesicles than in the fluid contents.

DR. SOPHIE RABINOFF, in closing the discussion, said that she could not say how long the vaccine would keep, since they had been able to obtain so little and had been using that immediately for prophylactic purposes. In most of the cases they had been using the virus from the vesicles directly.

With reference to the propagation Dr. Rabinoff said she had nothing to report, but Dr. Kling reported having propagated it successfully through six generations, using material from one vaccinated case to another.

She had not tried scraping the vesicles as Dr. Park suggested; there was so little serum in them that they had just taken what they could get.

THE USE OF SENSITIZED GONOCOCCUS VACCINE IN GONORRHEAL VAGINITIS.

DR. RUSSELL L. CECIL stated that a sensitized vaccine differed from other vaccines in that it had been treated with a specific homologous serum. The sensitized vaccine was less toxic than the nonsensitized and also gave a higher degree of immunity. Sensitized vaccines were first used by Besredka in experimenting with typhoid and cholera. Metchnikoff showed that apes were not only protected but that they were cured by the use of sensitized typhoid vaccines. They had now been used in many infectious conditions.

French writers had been very enthusiastic about the use of

sensitized gonococcus vaccine, especially in arthritis and orchitis but comparatively little had been written about the sensitized vaccines in gonorrheal vaginitis.

The series presented showed only twelve cases. These were, of course, too few to warrant one in coming to any direct conclusions as to the value of the treatment, especially since all the cases received local treatment at the same time. All of the patients in this series were under twenty-five years of age. There were two cases complicated by salpingitis and two by arthritis.

The duration of the disease before the treatment was started was a factor of some importance. A few had been treated locally before they had seen a bacteriologist. It was much more difficult to get results in cases of long standing. Two to sixteen inoculations were given at intervals of from five to eight days. He had been accustomed to start with a dose of 100 million, but he had used doses as high as 2000 billion in the course of the treatment.

In most of the cases there was a sharp local reaction, but in only one was there a marked constitutional reaction. The severe reaction usually came on after the first dose of the vaccine had been given. The reaction was not different from other vaccine reactions in character.

As to the results—as stated before nearly all of these patients had received local treatment, irrigations of potassium permanganate daily and silver nitrate distentions once a week. It scarcely seemed fair to rely entirely on the vaccines and not to give the patients the benefit of local treatment. The results had been satisfactory in all but three cases. One of these was still under treatment and the other two patients were frail and poorly nourished. They had very severe reactions and never developed any resistance to the vaccines.

It was very difficult to express any definite opinion on this series of cases and he had simply presented them so that the members of the Section might draw their own conclusions. The cases that were seen early responded more quickly to the vaccines than those seen after the infection had existed for some time. It should be remembered that the gonococcus sometimes disappeared long before the patient was cured, and hence treatment should not be abandoned too soon.

DISCUSSION ON DR. CECIL'S PAPER.

DR. WILLIAM H. PARK stated that they had never used sensitized vaccines owing to the fact that in their early work they found that agglutination did not develop so well as from the nonsensitized vaccines. But it had developed since that they had been mistaken in giving up the method for this reason for it has been shown that other antibodies develop. If sensitized vaccines were giving better results than the nonsensitized it was probably because they could be given in larger doses without any deleterious reaction.

Dr. Park said he had understood Dr. Cecil to say that in their

cases they had succeeded not only in controlling the symptoms but also in getting rid of the organisms and that was certainly somewhat better than they had done at the Willard Parker Hospital.

DR. R. OTTENBERG had had no experience with sensitized vaccines. He had been at first skeptical as to their probable value on account of the well-known experiments in the production of antibodies against red cells sensitized with hemolytic antibodies. In these experiments little or no antibodies could be produced by such injections after the red cells were completely sensitized; nevertheless, immunity against infection and the immunity reactions which can be demonstrated in the test-tube are not necessarily parallel, and the question as to whether immunity to infectious agents can be developed by sensitized vaccines, is one which will have to be settled chiefly by such clinical observations as those of Dr. Cecil.

DR. A. L. GARBAT said that Dr. Park had brought out that the sensitized vaccine did not seem to produce antibodies. In his experiments on typhoid made in association with Dr. Meyer, Dr. Garbat showed that no agglutinins and bacteriolysins were obtained with the sensitized vaccines as were with the nonsensitized, but they did get a bacteriotropic serum and also one that could protect and cure mice against injections of ordinary bacteria. Dr. Cecil evidently belonged to the class that believed in large doses of vaccines. He, himself, had been brought up on Dr. Wright's principles that nothing was gained by too large doses. Small doses produced a sufficient rise in the opsonins.

As to Dr. Cecil's results, there were several points open to discussion. Dr. Cecil did not say what type of gonococcus he had used nor did he state whether he had used a polyvalent vaccine. He did not say whether he had used a vaccine made from the infantile type of organism as it was recently shown that the adult and infantile types of gonococci differed greatly in their antibodies.

DR. ROYAL STORRS HAYNES asked Dr. Cecil how long he had followed these patients to see whether there were any relapses. This was important since these cases were so prone to relapse.

DR. J. S. FERGUSON had not used the sensitized vaccine but had used the nonsensitized in more than half a hundred cases and had obtained a definite improvement after two or three injections. He has also obtained more striking results in the acute than in the chronic cases. The profuse discharge changed to a very slight one quite regularly after three or four injections. In chronic cases in which there was an indefinite discharge one did not seem to get the same striking results. Dr. Ferguson asked Dr. Cecil if he had observed whether after the use of sensitized vaccines there was a fairly definite period in which one might look to see a reduction in the amount of discharge. It seemed to him that the length of time the disease had existed was a very important item, especially in children. He recalled a case of a child twelve years of age who had had attacks of enuresis at various intervals since early life. The last was accompanied by slight discharge and the gono-

coccus was found in the smear. It would seem probable that all cases of enuresis had a relation to the bacterial finding. One could not draw definite conclusions, but it seemed to him that one did not get as good results in the cases of long standing as in those that were recent. It was also difficult to determine in such cases when a cure had been accomplished.

DR. FENTON B. TURCK was interested in this presentation, more particularly because it was so conservative and because it called their attention to the necessity of making further investigations in reference to the action of sensitized bacteria.

Dr. Turck recalled an interesting case of a young girl who was supposed to be suffering from tuberculosis. She had lost weight, had a hectic flush, and an elevation of temperature for some months. Under the care of a physician she had been taking the outdoor antituberculosis treatment in England. On arriving in this country she had consulted Dr. Turck. An x-ray examination showed a glandular enlargement but the diagnosis with reference to the tuberculosis was not confirmed. Passing the stomach tube and examining the resulting specimen he had found the colon and pyocyaneus bacilli in symbiosis. An examination of the feces gave the same results from the lower bowel. He administered sensitized vaccines, 150 million; then waited five days and administered a second dose. This was followed by an anaphylactic reaction and after this the patient had no further symptoms. She now reported that she had been well for a year. This was an instance in which the result was absolutely due to the vaccines without any other treatment. In other cases he had had good results and thought that the sensitized vaccines promised to be an effective therapeutic agent.

DR. CECIL, in closing the discussion, said that Louise Pearce had shown that gonococci isolated from infants were different from those taken from adults both in agglutination and in complement fixation reactions. He had prepared his vaccines from ten Board of Health cultures of gonococcus, and his serum was from animals immunized against these organisms. The labor of making autogenous vaccine was great since it was necessary to immunize animals in order to get the sensitizing serum.

Dr. Cecil said it had been impossible to follow up the cases after they had been discharged. He assumed that they were doing well as they had not returned to him.

As to the time when these cases were treated, one got better results when the cases were treated early. Of course in those cases in which there was a profuse discharge the improvement was more readily observed than in cases with slight discharge.

BACTERIA-FREE VACCINE.

DR. HIDEYO NOGUCHI stated that the ideal vaccine should possess sufficient potency to insure a successful vaccination in cases in which there was no immunity and at the same time be free from

secondary bacterial contamination. The prevailing method of vaccine preparation at present consisted in the collection at an appropriate moment of the virus from the vaccine eruptions on the skin of the calf and then subjecting the raw material to the bactericidal effects of certain chemical reagents (glycerine, phenol, etc.), which did not impair the virus itself to any serious extent. By this treatment the contaminating bacteria were so reduced in number and kind that the material was now considered ripe for practical use. The method required stringent precautions in order to produce a model vaccine, and no product was regarded as ready for use before it had been left in contact with the chemical (glycerine) for a month or longer. It was evident that such labor and care could be spared if a method was found by means of which the virus could be propagated directly free from bacterial contamination.

The essayist said his attention had been engaged with this problem for the past year and he had now succeeded in propagating pure vaccine in the testicles of the rabbit and calf which was absolutely free of bacteria and preserved its virulence undiminished.

The testicle of the rabbit had been employed in recent years for the cultivation of spirochetæ, the *Treponema pallidum* and *Treponema pertenuis*; and the effects upon the organ of the inoculation of the usual vaccine virus had been studied slightly. However, the few experiments performed did not have in view the preparation of pure vaccine for practical use in vaccination.

The essential first step was to have for inoculation into the testicle a vaccine virus quite free of bacteria. This was secured by inoculating the carefully cleansed and shaved skin of a rabbit with glycerinated virus, protecting the vaccinated surface with sterile gauze, collecting the skin vaccine at the height of the eruption; and spores and spore-bearing bacteria having thus been excluded, emulsifying it in sterile salt solution and treating the emulsion with pure ether or with phenol in appropriate concentration. Nonspore-bearing material might thus be killed without seriously impairing the strength of the virus. Vaccine virus containing bacteria was unsuitable for testicular inoculation, since the inflammation which ensued favored the growth of the bacteria at the expense of the virus.

On the other hand, when the virus devoid of bacteria was inoculated into the testicle it multiplied very much as it did in the skin, so that on the fifth or sixth day maximal growth had been obtained after which, as the immunity arose, the multiplication fell off and, ultimately, the virus disappeared. Hence, the testicles were removed at the proper moment and employed, in part, for reinoculation.

But not every strain of vaccine virus could be transmitted to the testicles, and, moreover, several successive testicular inoculations were required in order to adapt even a favorable strain to the testicular growth. Once adapted, the propagation in the testicle seemed to proceed as regularly as in the skin.

DISCUSSION ON DR. NOGUCHI'S PAPER.

DR. FRANK S. FIELDER thought Dr. Noguchi should be complimented upon having done good and careful work. He had had the pleasure of seeing the pictures and specimens of testicles and regretted that they could not be shown on the screen. Dr. Noguchi had also permitted him to read the advance sheets of his paper on this subject which was to come out later so that he was familiar with the work that Dr. Noguchi had done and it fulfilled all the requirements of vaccine. It was identical with the standard glycerinized vaccine both in ordinary strength and in the various dilutions. It was naturally a desideratum to have a bacteria-free vaccine. However, they knew that they now had a vaccine produced in a standard manner and one that contained no pathogenic organisms. The authorities at Washington imposed a series of regulation tests which had to be employed by all those manufacturing vaccine from the skin of the calf.

It was formerly thought that a vaccine must be fresh, but they had learned that this was no longer desirable. They now got the green vaccine and mixed it with 50 per cent. glycerine and 1 per cent. carbolic. This was then plated and would grow some organisms, which, as a rule, were not pathogenic. They tested it out by plating it once a week on agar for five weeks. Usually after two or three weeks there was no growth on agar. They also plated it upon agar and also tested the vaccine for gas-forming organisms on glucose broth. It was also carefully tested for tetanus, but this was not found. The Hygienic Laboratory at Washington had also tested samples from other laboratories but had found none in thousands of specimens examined. It might be stated that as now produced standard vaccine was practically free from bacteria.

It might be stated that in their own laboratory Dr. Williams more than ten years ago succeeded in producing a bacteria-free vaccine on the skin of rabbits but it had not been possible to propagate vaccine absolutely free from bacteria on the skin of the calf.

As to whether a bacteria-free vaccine could be thus produced in the testicles of rabbits or bulls so that it would become a practical method the future would have to decide. The idea of propagating a virus in such an absolutely sterile way was appealing, and he looked forward to trying it out to see whether it could be produced on a large scale. In a few cases it had been employed on human beings and Dr. Noguchi had employed it on human beings as they did the standard vaccine. It remained to be proven whether it would produce 100 per cent. of successful primary vaccinations, which it must do to be practical. That it should not have done this thus far was not necessarily against the method and such a percentage might be obtained later. Another question was whether this bacteria-free vaccine would keep as long as the standard vaccine from the calf. Again it would have to be proven whether when human beings became immunized with testicular vaccine the immunity lasted as long a time as with the standard vaccine. The

method would have to be tested out and in time it might be substituted for the vaccine from the calf.

DR. PARK wished to speak of the harmlessness of the few bacteria in the standard vaccine. Until within a few years no consideration was given to the bacteria. It was demanded that the appearances of the vaccination in the calf should seem to be correct. Now they were trying to eliminate the bacteria. In order to prevent the increase in virulence of any bacteria in the calf the virus was passed from the child to the rabbit and from the rabbit to the calf. The bacteria from the calf's skin had never been shown to do harm.

Dr. Park asked Dr. Fielder whether vaccine from the rabbit was as permanent in its viability as that from the calf.

DR. FIELDER said they had some vaccine two years old from rabbits which they were using to vaccinate calves.

DR. PARK said that even leaving out the value of excluding the bacteria, the using of the rabbit would be an advantage in localities where they could not get calves.

DR. ALFRED F. HESS had been using these vaccines. He had employed them on twenty-five children and was glad to have this opportunity of speaking of his experience. He found that with the bacteria-free vaccine there were too marked systemic reactions in these children. He first vaccinated a series of twelve children under one year of age and there were ten good takes. There were two that did not take. In the ten that took the local reaction was quite marked, almost as much so as with the standard vaccine, but the systemic reaction was much less marked. The temperature never exceeded 100° F. He then vaccinated another series of twelve children. In one of these the vaccination did not take, but in all there was a marked local reaction and no systemic reaction. So out of the twenty-five children three of the vaccinations did not take, but in all the others there was a marked local reaction; first, a marked vesicle and then a pustular formation together with a lack of systemic reaction. The two children in whom the vaccinations did not take were vaccinated a second time but it did not take again. So from this small experience it might be said that this bacteria-free vaccine had the advantage of giving a slight systemic reaction but that possibly it was not as strong as that usually employed. Even if it did not take as often as glycerinated vaccine still for private patients and for vaccinating infants it had a decided advantage on account of the lack of systemic reaction. There was another question, namely, whether the systemic reaction is due to bacteria, and whether this lessened systemic reaction is due to the absence of bacteria.

DR. NOGUCHI.—It was my intention to illustrate my paper with lantern slides, but I am sorry to say that no previous arrangement was made for this purpose. I wish to say a word regarding Dr. Park's apprehension that in utilizing the rabbit material for practical purposes some organisms pathogenic for human beings might possibly be introduced into the organism, thus offsetting the ad-

vantages claimed by the testicular virus method of eliminating all bacteria hitherto associated in the propagation of the vaccine. The occurrence of such a possibility seems to me rather remote in the method of propagation advocated in my paper, since, so far as we now know, there does not exist any epizootic in the rabbit that is communicable to human beings. Compared with the calf, which animal is usually employed for the production of the ordinary vaccine virus, it is much more possible to avoid such an occurrence by the use of the rabbit as by that of the calf, as the latter is known to be spontaneously susceptible to tuberculosis and foot-and-mouth disease, both of which are communicable to man. In my opinion the advantage in this respect rests with the rabbits and not with the calf. At the same time we may use bulls as well as rabbits, as stated in this paper. In regard to the protective value of the testicular bacteria-free vaccine against variola, I believe it to be fully equal to that produced by the regular skin virus, as we found that both afforded the same amount of protection in animal experiments. It would be advisable, however, to follow the suggestion of Dr. Fielder that a trial be made in a series of cases, in order to determine whether or not the persons who were first vaccinated with the bacteria-free testicular vaccine are subsequently equally refractory to inoculation with the ordinary standard vaccine as are those who were previously vaccinated with the latter under identical conditions. I am very much interested to hear the report of Dr. Hess. The failure to take in three out of twenty-five cases might be due to the weak concentration of the virus in the preparation employed by Dr. Hess. This shortcoming is, of course, readily remediable, as a slightly stronger concentration can easily be made. At the same time, we must not lose sight of the fact that in the remaining twenty-three cases Dr. Hess observed a typical local reaction with only a slight general reaction—much milder than is usually the case with the ordinary vaccine.

EXPERIENCES WITH VACCINES AT THE MASSACHUSETTS GENERAL HOSPITAL.

DR. ALBERT E. STEELE of Boston presented this paper by invitation. He stated that the treatment of various infections by means of vaccines was started at the Massachusetts General Hospital in 1907, and since that time a clinic had been open daily.

The use of vaccines might be divided into prophylactic and therapeutic. Thus far the prophylactic use had been limited at the Massachusetts General Hospital to typhoid fever. The details of the treatment were similar to those observed in the United States Army and also their results.

The therapeutic use of vaccines might be conveniently divided into the treatment of local and general sepsis. While they had always considered that cases of local sepsis were more suitable for treatment than those in which the infection was more or less general, at times they had treated nearly all the acute general infections with vaccines.

The treatment of endocarditis due to the streptococcus viridans with an organism isolated from blood culture had not been very satisfactory. The course of the disease did not seem to have been influenced in any instance. They had treated a few cases of staphylococcus aureus septicemia, all of the subacute variety and although the vaccines did no harm, beneficial results had not been striking and it was the personal opinion of the essayist that these cases should not be treated in this way.

Influenzal bronchopneumonia, which existed in two types, the acute and chronic, had been treated with vaccines. In the acute type the vaccines did not seem to be of benefit. In the chronic type which might be mistaken for tuberculosis and which quite commonly had an extension of the infection during the winter months, they had inoculated a small series of cases with autogenous vaccines, but the series was too small to permit the drawing of any definite conclusions.

In localized sepsis the disease process was less extensive and the natural defensive resources of the body were not strained as in a case of general sepsis, hence it seemed quite reasonable that vaccines should be more effective in cases in which the disease was localized. It was to be remembered that vaccines did not supply the body with any defense, they merely stimulated into action the natural protective forces.

In furunculosis the vaccines had given the most brilliant results. The extensive incisions formerly thought necessary were now made only large enough to secure adequate drainage. The vaccines were injected subcutaneously twice a week in doses from 50 to 250 million. Most of the cases healed promptly but those that did not were given autogenous vaccines. Of 198 cases, 85 per cent. recovered following this treatment. Of the remaining 15 per cent. some showed improvement but discontinued treatment while some had constitutional diseases which removed them from the simple furunculosis class.

Some cases of pyelitis and colon cystitis which had proven resistant to other forms of treatment were subjected to the vaccine treatment, autogenous vaccines being used. While the number of cases was small, only thirty, their results showed that 22 per cent. became bacteria free following the treatment. In addition 44 per cent. stated that certain symptoms such as pain, tenesmus and frequent micturition were relieved, although the bacilli still persisted. Thirty-four per cent. of the cases had received no benefit. Large doses of vaccine had been given in some of these cases, as much as 1000 million being given at one time without appreciable benefit or ill-effect.

The treatment of gonococcus infections with vaccines was now confined to cases of gonorrheal arthritis and a few cases of resistant gonorrheal vaginitis. At present all the arthritic cases had the gonococcus complement-fixation test performed before the commencement of treatment. Continued vaccine treatment did not seem to make a positive test negative. On the other hand, repeated

injections of a gonococcus antigen apparently kept the test positive. Gonococcus vaccines did not confer a high degree of immunity.

They had used sensitized vaccines to some extent. The sensitizer for each emulsion was a human serum strongly positive to the gonococcus complement-fixation test. They had had no experience with gonococcus emulsions sensitized with an animal serum. The results from sensitized vaccines had been identical with those secured from vaccines made in the ordinary way. While it was exceedingly difficult to compile statistics showing the results of the treatment in gonorrheal cases, since the number of cases that formerly were considered well but which still had a latent focus was quite large, and since the repeated injections of vaccines tended to keep the fixation reaction positive. However, among 149 cases 35 or 23 per cent. became clinically well. That is the joints were not swollen, there was no effusion, no stiffness and no tenderness, and the patients were able to do their ordinary work. Of the 149 cases 109 or 73 per cent. were relieved, that is, they were well enough to do their ordinary work but some slight symptoms remained. Four or 5 per cent. were not relieved. These were the chronic cases which had had several attacks of gonorrhea with arthritis.

In conclusion Dr. Steele said that they believed that the treatment by means of vaccines had a definite place in the routine work of the hospital, but that its exact value would only be determined when comparative statistics were more available than they were at present. They did not believe in the vaccine treatment for colds or other self-limited processes, nor in the use of mixed bacterial filtrates. All treatment of bacterial infections should be specific whether that treatment was by means of vaccine, bacterial filtrate or serum.

DISCUSSION.

DR. RUSSELL L. CECIL felt that the three types of infections that were most benefited by vaccines were staphylococcus, gonococcus and *B. coli* infections. As to streptococcus infections he had found that in certain infections of the upper respiratory tract they were of considerable benefit. There were so many kinds of streptococcus infection that it was essential to have an autogenous vaccine. He related the case of a patient with a streptococcus infection of the glands of the neck. He was so septic that it was thought he would die. The ordinary autogenous vaccine was given but without effect. Sensitized vaccines were then given and he ran along in somewhat better condition for about a week, when his temperature became high and there was a metastasis in a joint. This was opened and drained. There were any number of positive blood cultures and it was thought that he had an endocarditis though he had none of the usual physical signs. He finally got well. There were many such cases in which ordinary vaccines were useless, but in which a fresh autogenous vaccine was effective.

DR. FRANK S. FIELDER asked Dr. Steele what his opinion was

in reference to the cases commonly treated with autogenous vaccines made from the root of a tooth which was considered as the source of infection. A great deal had been written recently as to the part played by defective crown and bridge work as a source of trouble around the sockets of teeth and that these infections were responsible for joint infections. He would like to know what was Dr. Steele's opinion on this subject.

DR. ALBERT E. STEELE, in closing the discussion, said that with reference to the streptococcus in the respiratory tract he had had little experience; most of his work had been with influenza cases. With reference to the streptococcus causing various infections, the primary seat of the infection being at the root of the tooth, at the Massachusetts General Hospital the policy would be to pull the tooth and to get rid of the focus of infection before using the vaccines, for they did not believe that vaccines would confer immunity enough to overcome an infection of that sort until after proper dental surgery had been employed.

TRANSACTIONS OF THE AMERICAN PEDI- ATRIC SOCIETY.

Twenty-seventh Annual Meeting, Held at Lakewood, N. J., May 24, 25, and 26, 1915.

The President, GEORGE N. ACKER, M. D., of Washington, in the Chair.

(Continued from August number.)

THE COMPOSITION OF WOMAN'S MILK.

DR. L. EMMETT HOLT presented the results of analyses of thirty-five specimens of woman's milk, twenty-nine individual specimens for twenty-four hours and six composite specimens. The results of such analyses should prove useful since they had no standard by which to determine whether a milk was normal or pathogenic. The analyses were made for different periods, viz., the colostrum, transitional, mature and late periods. The results were best demonstrated by the following table:

Periods	Number of cases	Fat	Sugar	Protein	Ash
Colostrum.....	5	2.85	7.59	2.25	0.3077
Transitional.....	6	4.37	7.44	1.56	0.2407
Mature.....	17	3.26	7.50	1.15	0.2062
Late.....	7	2.96	7.45	1.02	0.2080

A table was also presented showing the distribution of ash during the different periods. The ash of the colostrum period was high in sodium and potassium chloride. The CaO was almost the same throughout the whole period. For the mature period from the

end of the first month to the tenth month the close resemblance in the ratio between proteid and ash in woman's milk and cow's milk was astonishing.

The following table showed the percentage composition of ash per 100 parts of woman's and cow's milk.

	CaO	MgO	P(2)O(5)	Na(2)O	(2)O	CL
Woman's.....	23.2	3.7	16.5	8.0	28.2	16.6
Cow's.....	21.8	2.9	28.9	7.2	26.5	13.0

DR. GERSTENBERGER asked Dr. Holt if they had made the determination for iron and if they had found that cow's milk had less iron than human milk.

DR. THOMAS S. SOUTHWORTH said there was an interesting point with reference to the transitional period. This was the time when they were confronted with the bad effects of high fats in the maternal milk and got the gastrointestinal disturbances, and it was interesting to note in the tables that the fats were abnormally high at that time and then there was a tendency for them to fall; if in treating these cases they failed to overcome the difficulty by definite measures, nature came to their assistance by lowering the amount of fat.

DR. HOLT said that with reference to Dr. Gerstenberger's question, the amount of iron in woman's milk was something like 1.7 milligrams in 1000 c.c. They had not made the analyses themselves but had accepted the figures of Bart and Eberstein on this point.

A PLEA FOR ACCURATE STATISTICS IN INFANT'S INSTITUTIONS.

DR. HENRY DWIGHT CHAPIN, New York, stated that in a report read at the last meeting of the Study and Prevention of Infant Mortality it had been correctly stated that the gravity of this problem of mortality in infant's institutions could not be correctly stated. Practically no one knew how many infants passed through these institutions each year, whence they came, or whither they went at the end of their stay. "How many die, how many of those who live, lead lives of suffering and impaired usefulness, and possibly of dependency and crime, through the action of causes that might have been prevented,—these were the questions for which answers must be sought."

The problem was here very well stated and no question of greater importance had come before a body of pediatricians for discussion and attempted settlement. The first essential was a full knowledge of all the facts, which at present were unknown. If a close co-operation could be established between physicians working in this special field and the institutions covering it much might be accomplished in mapping out a program that could attempt to conserve the good and do away with the evils that had grown up around this work. That the operation of these institutions left much to be desired was known to all who were engaged in the work. This was

not intended to impugn motives, but the time had come to see if all this energy was expended in the wisest way, and if not, how the methods could be improved.

Statistics from the Report of the New York State Department of Charities for 1909 to 1913 of eleven institutions in the State in which the death rate for babies under two years during this period was based on the total number of children cared for, varied in the different institutions from 183 to 576 per 1000, with an average mortality rate of 422.5 per 1000. During this same period the death rate of children under two years of age, based on the estimated population of the State at that age, was 87 per 1000, or about one-fifth of that in institutions. Institutional infants in a series of 1738 admitted at various ages under one year, 22.7 per cent. of all admitted died before completing the first month of residence, and 34.9 per cent. before completing the second month. Including all deaths 44.3 occurred in less than one month after admission, and 68.7 per cent. in less than two months.

In a recent article the writer reported a study of the mortality in ten infant asylums located in different cities of the United States. The time covered varied from four to twenty years, taking the shortest and longest intervals. The rates were based on the ratio between yearly admissions and death rates varied from 31.7 per cent. to 75 per cent.

In all but one of these institutions deaths included all infants under two years. The showing would be worse if the mortality were restricted to infants under one year of age. Drs. Holselar and Rude of San Francisco reported mortality in the foundling asylums of that city of 50 per cent. On boarding out babies with foster mothers in order to insure undivided care, the mortality in the same class of cases had been reduced to 12 per cent. Death rates general and special and morbidity rates according to Woodward, must be relied upon to show where and how sanitary work must be done and to exhibit the results of sanitary work already under way. It was hence exceedingly important to have accurate knowledge of all possible data as to morbidity and deaths that might throw light upon the results of methods of operation either accomplished or under way. In order to secure such knowledge certain specific facts should be given which, in reports accessible to the writer, were rarely stated or properly analyzed. All facts that could present a fair picture of the health and hygienic condition of an institution should be carefully presented. Special care should be taken in keeping records of babies under one year of age. The individual study of each baby should include the history on admission, age, physical condition, length, weight, general nutrition, previous feedings, history, and record of antecedent diseases. The babies should be classified or graded by ages on admission and physical condition, weight, length and nourishment. Summaries could then be made showing the average gain or loss under each heading. Comparisons could thus be made with noninstitutional babies. There should also be kept a record of the diseases acquired during the

baby's stay in the institution. Summaries of individual records could then be made showing the number of cases of each disease, of communicable diseases, mixed infections, and these diseases could be classified as to their preventability. The final summaries should show the average age on admission, the average length of stay of those who lived and those who died, together with the total number of admissions and discharges. It would also be of interest to have a proper follow-up system which could show among other data how many of those discharged before one year of age live to be a year old.

DISCUSSION.

DR. HAMILL wished to thank Dr. Chapin for having brought this subject before the society. The mortality shown by these investigations was enormously high even though allowance was made for the lack of definite standards in collecting data. The statistics of some institutions were falsified. He knew of one institution in which at a meeting of the Board a report was read stating that the mortality rate was 10.8 per cent. He had evidence that this was not correct since he knew the medical staff in that institution. A physician was only called when an infant was in a moribund condition and yet that institution was permitted to exist. The responsibility for these conditions and for their correction rested with the medical profession.

DR. LANGLEY PORTER said the striking thing in Dr. Rude's work in San Francisco was that they had had a mortality of 65 per cent. among institutional infants and that this had been reduced to almost nothing. The reason was that the infants were boarded out and were carefully followed up. A nurse visited them once within the week and a physician once within a month. Arrangements were made so that in case of emergency a physician could be obtained immediately. The foster mothers became attached to the babies and were willing to give ready compliance to regulations, knowing that if they did not do so the babies would be promptly taken from them.

DR. SOUTHWORTH said such exact statistics as Dr. Chapin had shown the need of would be extremely valuable, but he was not very hopeful that he could get such accurate statistics as he desired. Dr. Southworth said he knew of one instance in connection with an institution that was no longer in existence in which on every admission card was marked "hopeless" and that covered all subsequent happenings.

DR. JOHN MASON KNOX, Baltimore, said that in Baltimore among 200 foundlings carefully followed up by a supervising secretary it was found that between 89 and 90 per cent. died. The 10 per cent. that survived had been taken from the institution for a time. None of the infants that stayed continuously in the institution lived. Either these institutions should be improved by giving the children a normal amount of care or else foster homes should be provided. They had had no trouble in getting good

foster homes for the infants in Baltimore as many suitable persons volunteered.

DR. HENRY L. K. SHAW, Albany, said he was very glad Dr. Chapin had brought this subject before them as he knew of no body of men better adapted to solve this problem than the American Pediatric Society. Dr. Shaw spoke of the difficulties and complexities involved in collecting reliable statistics, but thought that conditions in institutions for infants had improved somewhat since Dr. Jacobi had made the statement that at the Randall's Island institution 100 per cent. of the babies died. The highest mortality was in institutions controlled by religious orders. As to the placing out of infants, some had to remain in institutions by reason of physical defects that made them undesirable to foster mothers, and again because a baby had to have certain requirements before it was permitted to be sent out of the institution. So there was always a certain number of children that would have to be kept in institutions. It was important that they should get at the facts and improve existing conditions.

DR. CHAPIN, in closing, said that the President of this Society last year said that one of the functions of the American Pediatric Society was that of dealing with subjects that touched the public at large and that they must recognize public health questions. One of the most important of these was the problem of infant mortality. A great deal had been done in the reduction of infant mortality along many lines, but the factor that was doing more than any other to keep the infant mortality rate high was the high mortality in institutions for infants, and still they allowed these institutions to exist. They all knew that the mortality in these institutions was double and treble what it should be and the question was what could be done to prevent it.

Second Day, Tuesday, May 25, 1915.

SOME STUDIES ON SUGAR IN INFANT FEEDING.

DR. CHARLES HUNTER DUNN, Boston, and DR. LANGLEY PORTER, San Francisco, presented a series of cases in which high percentages of different varieties of sugar had been fed and the results observed with special reference to the urinary findings. There seemed to be no relation between the amount of sugar ingested and the sugar in the urine. There was often more found when maltose was ingested than when lactose was given. The babies upon whom they had tried feeding large percentages of sugar were all those belonging to the class known as difficult feeding cases. In these they had given sugar up to 12 and 14 per cent. All gained in weight, but in some instances the gain in weight was enormous. These studies led to the conclusion that the danger of sugar intoxication had been greatly exaggerated, and that large amounts of sugar could be given with advantage in certain difficult feeding cases, especially those showing an inability to attack a large amount of fat. There

was but little danger from such a procedure since the signs of sugar indigestion were easily recognized and could be quickly averted by lowering the amount of sugar, while the benefit of pushing sugar beyond the limits usually considered safe were great.

DR. ISAAC ABT, of Chicago, said that in the evolution of alimentary intoxication the sugar found its way into the circulation because there was damage to the intestinal wall caused by bacterial action or the toxic products that were the result of bacterial action. When one spoke of food poisoning he meant that the food elements broke through the barrier, entered into the metabolism, and did harm. In testing for galactose in the urine, they eliminated the uric acid and other products before the test was made.

DR. SCHLOSS said he had been making tests by the copper and bismuth methods and indeed by every known method to determine the reduction substance in the urine and sugar might be present as a monosaccharide.

DR. HOLT said that if by giving large amounts of sugar the child gained rapidly for a few days, then a break came and this gain was rapidly lost. The question remained, "What had the child really gained?" One of the greatest difficulties was in feeding children with intolerance to carbohydrates, as it was difficult to make them gain in weight since one could use sugar only in small quantities. In reference to the sugar content of *Eiweiss* milk, if it was made according to the formula it contained only one-half as much sugar as did buttermilk. When the curds were washed through the sieve both the sugar and salts are reduced in quantity. The reduction in the sugar was probably one reason the children did not gain on protein milk, and the idea that it was because the salts were not furnished did not hold.

DR. KOPLIK said that the amount of sugar that was given should be limited to normal quantities. If large amounts were given the child gained for a time, then stood still, and then lost, and no real progress was made. Sugar should only be given within proper limitations.

DR. GERSTENBERGER asked if the protein content of the food fed these children was also high. If there was a high protein content, that would permit of a higher percentage of sugar, while a low protein content would limit the amount of sugar that could be taken.

DR. SHERMAN referred to a few tests that they had made in Buffalo as to the effects of the different sugars on the gastric secretion. Sixteen babies were fed on 6 per cent. dextromaltose, cane and milk sugars, dissolved in barley water so as to give bulk. The babies took all the solutions well. They concluded that cane sugar stimulated the secretions more than milk sugar; that dextromaltose stimulated the secretions twice as much as milk sugar. It was important to remember this in feeding infants with hypersensitive stomachs.

DR. GRIFFITH said they had been using malt-soup mixtures and buttermilk and cane sugar and these had a high carbohydrate percentage. They found that the children took from 10 to 13 per

cent. of carbohydrates well. It was not a question of temporary gain but they had had better results with this method of feeding than with any other.

DR. DUNN, in closing the discussion, said that in his series of cases the gain in weight was retained. These babies had a high tolerance for sugars and the sugar was cut down as soon as any intolerance developed. Whether the children went to pieces depended not only on the length of time they were kept on the high percentage of sugar but also upon whether high percentage of fats was also fed. Fat intolerance might be caused by an excess of sugar or protein fermentation. The amount of protein in the food made a great difference in the sugar tolerance. They had made observations along this line in some of the earlier babies of the series by varying the amount of protein. In judging of the effects of the sugar content of the food, it should be noted that some sugar contained gas spores and other impurities, causing effects which might lead one to draw wrong conclusions. The sugar must be carefully boiled to avoid such errors, Finkelstein was now using higher percentages of sugar than formerly.

THE INDICATIONS FOR TREATMENT IN SEVERE DIARRHEA IN INFANCY.

DR. JOHN HOWLAND and DR. W. MCKIM MARRIOTT, of Baltimore, considered a type of diarrhea which all recognized as particularly serious in infants. It was especially apt to occur in those infants that, as a result of diarrhea, were more or less malnourished. After perhaps a few days of mild diarrhea the stools became large, watery and frequent. The infants were at first restless and sleepless; later it was frequent for stupor to develop, and oftentimes coma. The urine was very scanty and extremely acid, frequently containing albumin and casts and sometimes sugar. Respiratory symptoms were very often present especially toward the close of the disease. These might consist in a slightly increased ventilation of the lungs or the disturbance might be so great as to amount to severe dyspnea. There was, however, no cyanosis. Postmortem, the lesions were insignificant. This type of diarrhea had been called "toxicose" by Czerny and "alimentäre intoxication" by Finkelstein. During the past summer, many determinations had been made with reference to the alveolar air. In infants who had severe diarrhea, especially if dyspnea was present, the carbon-dioxide tension was found to be very much lower than in health, and the more severe the dyspnea the lower the carbon-dioxide tension. It was found also that as improvement took place, the tension rose. As low carbon-dioxide tension was one of the evidences of an acidosis, other evidences of this had been sought. The blood serum had been examined by the phenolphthalein test of Sellards and it had been found that in infants with severe diarrhea, a change could be noticed varying from a slight diminution in the color to complete absence of color. The hydrogen ion concentration of the serum had also been investigated and had been found to be increased. The urine of these infants had been found very scanty and strongly acid. These infants had had a very marked tolerance for alkali, whether given by mouth, intra-

venously or subcutaneously; three, four or even five times as much alkali had been required to cause an alkaline urine as in health. There was also the evidence afforded by the influence of the alkali when given by mouth, intravenously or subcutaneously. When the alkali had been taken in sufficient amount it had brought about a normal hydrogen ion concentration of the blood, had caused the Sellards test to give a deep purple with phenolphthalein, had stopped dyspnea and had caused a return of the carbon-dioxide tension of the alveolar air to normal or even abnormally high limits. An examination of the urine for acetone bodies had usually been without result. In view of these findings it seemed perfectly fair to say that these patients suffer from a very severe acidosis.

The acidosis was probably a relative one, caused by the loss of alkali from the intestines. It seemed, therefore, bad practice to give cathartics which would irritate an intestine already too irritated and cause a loss of material from the bowel which it was vitally necessary for the infant to retain. Unless an infant was distended, cathartics were contraindicated; opium was to be given in amount only sufficient to diminish the excessive diarrhea.

It was also necessary to give soda by mouth, by rectum, intravenously or subcutaneously. The intravenous was the method of choice, if a vein was accessible. It should be given in large enough doses to cause a cessation of the dyspnea and alkaline urine. This method of treatment improved the likelihood of recovery but did not mean that recovery would inevitably ensue. The severe acidosis might be combated, and yet death might take place. In closing, Dr. Howland said that this condition should not be termed "food intoxication;" it was due not to the presence of abnormal substances, but to the absence of substances that were very normal and necessary to life.

DISCUSSION.

DR. GERSTENBERG asked Dr. Howland what dosage of alkali he gave by the mouth and intravenously.

DR. KOPLIK had always taught that opium was a very dangerous drug and that it was very difficult to gauge the dose in severe cases of diarrhea in infants and children. He did not see why one should stop the diarrhea and the peristalsis which was the means by which nature eliminated a noxious substance which would otherwise be absorbed into the circulation and increase the difficulties. Years and years of clinical work with babies had taught him that it was best to treat them without opium of any kind.

DR. CHARLES GILMORE KERLEY said that opium was one of the best drugs they had if it was used in the right way. Drainage must be maintained but not to the point of exhausting the patient. Opium was indicated in moderate doses, sufficient to control the diarrhea.

DR. ISAAC ABT would like to hear what Dr. Howland's opinion was with regard to feeding in these cases. The feeding was more important than the giving of alkalies. What did he do in the way of feeding to prevent acidosis?

DR. BLACKADDER said one could do almost anything with opium. By giving small doses one could give the digestive fluids a chance to act and favor absorption. Large doses of cathartics exaggerated the diarrhea and hurried the intestinal contents through the digestive tract and the large bowel, while opium in doses sufficient to control the extreme peristalsis did a great amount of good in these cases. Dr. Koplik's statement should not go out from this meeting without some modification.

DR. MORSE said that it seemed to him that the question as to whether opium was indicated in diarrhea or not depended on the circumstances in the individual case. If there was something in the bowel and one wanted it out then a cathartic was indicated. If, on the other hand, the diarrhea was simply draining the tissues then opium should be given. The cases to which Dr. Howland referred belonged to the second class and opium should be given. Another point that came up was whether in such a disturbance of the digestion there was any absorption from the bowel, whether toxins would be absorbed even if they were present in the intestines. There was something else also to be drawn from this paper and that was that it was advisable to give alkalies before the appearance of severe symptoms.

DR. TALBOT said that in studying diseased conditions it was important to know the normal ones, and he had recently been studying physiological acidosis. It was necessary to know about acidosis in normal conditions in order to make comparisons in pathological ones. In studying 100 new-born babies he found the respiratory quotient very low on the second and third day of life. Such a low respiratory quotient was found in acidosis in diabetes when there were no acetone bodies in the urine. This substantiated Dr. Howland's findings of a low carbon-dioxide tension in the alveolar air before acetone bodies appeared in the urine.

DR. HOWLAND, in closing, said he disliked the term acidosis because it was so loosely applied. A small amount of acetone bodies did not mean acidosis; it was only when the protective mechanism was brought into play that a pathological acidosis was produced. If a child had a disturbance accompanied by high fever and the intestines were filled with fermentative and putrefactive substances then opium should not be employed, but, if there was nothing in the intestinal tract and the diarrhea was a protective process carried to the extreme and accompanied by the excretion of large amounts of alkali which was causing the symptoms, then opium should be given, not sufficient to cause the child to go into coma, but in small quantities, a few drops after each loose stool. It was surprising how much opium these children could take without its influencing their stupor in the slightest degree. All drugs were dangerous and when one was given for a serious condition it had to be in sufficient quantity to produce the effect. He gave 4 grams of alkali at a time subcutaneously, 5 or 6 grams intravenously, and 3 or 4 grams by the mouth at one time. The diet was extremely difficult to manage. The majority of these children died but with intelligent treatment it was possi-

ble to save more than if the indications for treatment were disregarded.

THE ETIOLOGICAL RELATIONSHIP OF SYPHILIS TO CHOREA OF SYDENHAM.

DR. HENRY KOPLIK, New York, stated that the investigations into the etiology of Sydenham's chorea had been devoid of any special results. There was clinically an undoubted connection between chorea and endocarditis and between chorea and rheumatic joint manifestations. Of late there had been an effort to connect chorea in an etiological way with syphilis. On the appearance of salvarsan this remedy had naturally been tried. Arsenic had for decades been a favorite remedy in chorea. What with pushing this drug to the point of toleration by the mouth could be more natural than to apply it in another form by injection into the circulation? Bokai thought it was of great benefit in the treatment of chorea, especially in cutting short the duration of the affection. From this to the surmise that there was a connection between chorea and syphilis was but a step. After reviewing the reports of the various investigators who seemed to have observed this association, Dr. Koplik said he had endeavored to enlighten himself as to the relationship between chorea and syphilis. He took ten successive cases of chorea in his hospital service at the Post-Graduate Hospital. In five of these cases there was an endocarditis on admission to the hospital, with an evident lesion of the valves; in three cases there was a distinct history of rheumatism; in ten cases a Wassermann test was made, and in eight the result was satisfactorily negative. In two the reaction failed, but was not positive. In all the cases there was absolutely no stigmata of syphilis, hereditary or otherwise. There was no reason why, had a sufficiently large number of cases been subjected to the Wassermann test, they might not have met cases in which syphilis was present. For a child affected with syphilis might contract chorea just as readily as another. The presence of syphilis might be an accidental find. The attempt of the French writers to accept a luetic basis for chorea, on the ground that the salvarsan treatment was of special effect in chorea was also to the essayist not convincing. For the benefit of the service and of these choreic children, Dr. Koplik determined to test the action of salvarsan in chorea minor. Nine cases were injected with doses of varying size. In seven of the cases thus injected no striking amelioration of the symptoms, such as had been reported, was observed. Even after a second and third injection the chorea continued to run its accustomed course. In another case nephritis resulted and the patient was ill with the chorea for some weeks, although finally a recovery took place. The administration of salvarsan requiring a certain amount of apparatus was not exactly applicable as a therapeutic measure in chorea. Nor could the drug be said to exert such a striking improvement as to encourage a continuance of its use, neither did it prevent a relapse. In fact there was nothing in the after-effects to warrant an assump-

tion of a possible syphilitic or parasyphilitic influence as a causative factor in the chorea of Sydenham. In the opinion of the essayist they had not in salvarsan an agent of any value above what had hitherto been in vogue in the treatment of chorea minor, nor were they warranted in tracing any relationship between chorea and hereditary or acquired syphilis.

DR. HOOBLER observed that streptococcus viridans had been found in the blood of four patients suffering from chorea at Bellevue Hospital, and that this organism had also been found in a number of instances by English observers.

DR. SAUNDERS called attention to a sign which he made use of in the diagnosis of chorea. This was dependent on the fact that during the first septima of life when asked to open the mouth a child also separated the fingers. If the child had chorea he did not do this. It was his custom to keep a child with chorea in bed and out of school until the association of these two movements again appeared.

DR. ABT wished to say a word with reference to the arsenic treatment of chorea. He had adhered to the use of arsenic in chorea for some years but noticed that some children became ill with neuritis after taking arsenic. He had now abandoned the arsenic and relied upon the rest treatment, and where there was rheumatism, on the salicylates.

DR. KOPLIK had mentioned in the first part of his paper that Cohn and Sachs had found microorganisms in the blood of choreic patients and that Dr. LeFetra had isolated the streptococcus viridans in several cases at Bellevue Hospital. He had taken the cultures of probably as many as two dozen cases and was very much annoyed that others had found organisms that he could not find. Arsenic was one of his favorite remedies since it was very useful in the tonic treatment of chorea, but he felt rather uncertain as to its usefulness in the disease itself.

THE REDUCING SUBSTANCE IN SPINAL FLUID.

DR. OSCAR M. SCHLOSS and DR. LOUIS C. SCHROEDER, New York, made this report which was based on a series of quantitative determinations of the reducing substance in spinal fluid and on certain observations concerning the nature of the reducing agent. In order to obtain additional evidence in this subject three specimens of cerebrospinal fluid, from 400 c.c. to 600 c.c. each, were precipitated with alcohol and evaporated to small bulk in slightly acid solution. This concentrated solution was dextrorotatory and a comparison of the quantity of dextrose calculated on this basis with a determination by Benedict's quantitative copper solution were in close accord. The solution fermented readily with yeast and gave a typical osazone, insoluble in hot water, soluble in pyridine and melting at 200 to 210° C. A repetition of this procedure of Halliburton gave no precipitate of pyrocatechin. As further proof other observations were made. By using a slight modification of the method of Benedict and Lewis for blood sugar they had been able to make accurate determinations

with only 5 c.c. or even less of spinal fluid. The results of their examinations in twenty-six cases were tabulated and admitted the following summary: The reducing substance in spinal fluid was a fermentable, dextrorotatory sugar, probably dextrose. In infants free from meningeal disease the spinal fluid sugar ranged from 0.05 to 0.134 per cent. approximately the same figures which were obtained for blood sugar. In cases of meningism the spinal fluid sugar was normal. In epidemic cerebrospinal meningitis and suppurative forms of meningitis the sugar was greatly reduced or absent. A large proportion of the cases of tuberculous meningitis showed a decrease in the sugar of the spinal fluid. In a number of cases, the sugar was normal or diminished but slightly. A decrease of sugar only was of diagnostic value in this disease. The reducing substance was not decreased in cases of idiocy, cerebrospinal syphilis or anterior poliomyelitis.

DR. HAND had examined a number of specimens of spinal fluids and had felt that the reduction substance present was a sugar though he had not gone as far with his observations as Dr. Schloss. He had been struck by the fact that there was something absent in suppurative meningitis that was present in tuberculous meningitis and he had been so much impressed by this difference that he had used it for diagnostic purposes. The presence of sugar in the spinal fluid of cases of meningitis had stimulated him to search for the tubercle bacilli.

DR. HOOBLER asked Dr. Schloss if these investigations were of any help from a standpoint of prognosis and whether the injection of a serum containing sugar caused an increase in the amount of sugar in the spinal fluid.

DR. SCHLOSS said, with reference to the prognosis in cerebrospinal meningitis, that if there was a reappearance of sugar in the spinal fluid that was one of the best indications of improvement. He had noticed in a small series of cases of cerebrospinal meningitis that at the first examination there would be no deduction substance and no sugar or only a small amount, but after the injection of the serum there would be a perceptible rise in the sugar and this would be accompanied by a marked clinical improvement. As to the reducing substance in the serum, the quantity was so insignificant that he doubted if it would have much influence.

ACUTE CEREBELLAR ATAXIA IN CHILDREN.

DR. J. P. CROZER GRIFFITH, Philadelphia, reported this case which occurred in a female child five years of age. The noteworthy features were the rapid development of symptoms without discoverable cause, unless possibly the child had suffered from influenza; the very uncommon degree of nystagmus, the ataxia of the extremities; disturbance of the sensorium; affection of speech; slight increase of reflexes, and the rapid recovery, completed within one month from the onset. These symptoms pointed chiefly to some disorder of of the cerebellum, but that was the only portion of the brain affected

would seem questionable. It was impossible to draw a sharp line between the cerebellar and the cerebral cases. After reviewing the classification of Fickler, Dr. Griffith stated that according to this classification the encephalitic cases followed especially the infectious diseases. The toxic cases would be represented in early life by those depending upon gastrointestinal autointoxication. Clinically it would be difficult to make a sharp distinction, and in connection with this case the two might be grouped under the heading of acute non-suppurative encephalitis, or acute hemorrhagic encephalitis. The prognosis of the great majority of cases of acute nonsuppurative encephalitis, whatever the location, was favorable as far as life was concerned, and as regarded improvement, but less so regarding complete recovery of power and of a normal mental condition. After reviewing seventeen cases collected from the literature and analyzing them the essayist concluded that as an immediate apparent cause of the attacks infectious diseases were very evident. The complex symptoms based on the composite of all the cases seems sufficient to warrant a belief in the cerebellar origin. Disturbances of the sensorium were present in the early stages of a large number of cases. Unconsciousness was mentioned in eleven instances. Convulsions were occasionally seen; delirium was also observed. All of these might be classed among the symptoms common to any intracranial lesion; or they might be the evidence of a complicating disturbance in other regions than the cerebellum. Some affection of mentality apart from unconsciousness was present in twelve cases. In most of them it was of brief duration. The disturbance of speech sometimes lasted for months. It was possible that in producing the speech disturbance the medulla was also involved and the same was true of vomiting. It was evident that there was a distinct tendency to increase of the reflexes in this disorder, pointing toward the cerebellar involvement. The series showed how frequently there might be a cerebellar ataxia without nystagmus. In seven of the cases it was stated that entire recovery took place. There was every reason to believe that in some instances very few if any evidence of the disease would remain. However, that severe symptoms might persist for a long time and probably always was shown by at least eight of the cases, and in some of these some intellectual or psychic abnormality remained.

FOREIGN BODY PNEUMONIAS.

DR. A. CAILLÉ, New York, stated that during his four months' service at the Post-Graduate Hospital during 1914, he had the opportunity of observing the behavior of foreign bodies in the deep respiratory tract in three cases. Two of the cases were sent to the wards with an outside diagnosis of "unresolved pneumonia" and without the suspicion of a foreign body in the lungs. The third case came with a foreign body history. In the first case the spasmodic character of the cough, the expectoration of pus in an acute lesion in the absence of amphoric breathing such as was found in cavity formation, gave rise to the suspicion of a foreign body irritation. The

röntgenogram which was exhibited showed a large tack with a large round head in the right lung. After a second attempt their bronchoscopist succeeded in removing the tack. Rapid recovery followed.

In the second case there was a history of pneumonia following which there was no resolution. The child's spasmodic cough had persisted for a year. The routine physical examination was negative except for a slightly positive von Pirquet reaction and a secondary anemia. Percussion over the left chest gave an almost flat note, posteriorly there was dullness to flatness from apex to base. Over the right lung posteriorly the percussion note was impaired. On auscultation over the left lung anteriorly many coarse and subcrepitant râles were heard. Bronchial and tubular breathing was heard over the left chest posteriorly with numerous crepitant and coarse râles. Over anterior and posterior right chest a few coarse râles were heard. No pus was found on puncture. The röntgenogram showed a large nail in the left bronchus and partly in the trachea. The first attempt at removal with the bronchoscope and forceps failed, but was followed by the coughing up of considerable yellow pus. Later a lower tracheotomy was performed and the nail was removed by the aid of the bronchoscope. By the following day an extensive pneumonia developed and the child died. In all probability the nail had been in the child's lung for over a year.

The third case was brought to the hospital with the history of having swallowed a shawl pin three days previously. An x-ray plate revealed the pin in the left bronchus, the point projecting at the bifurcation of the trachea. The first attempt to remove the foreign body was unsuccessful and one day previous to the date set for a second attempt the child during spasmodic cough coughed up the shawl pin. The pin had been in the child's lungs forty-three days without causing local inflammation. The speaker thought the following deductions warranted: First, all cases of unresolved pneumonia and cases of pneumonia of atypical behavior should be x-rayed. Second, all foreign body cases should be publicly reported in the lay press, as a warning to those having charge of young children to keep things out of reach and not to teach the dangerous practice of putting things in the mouth by example. He said this because many mothers had the habit of putting safety and stick pins in the mouth.

DISCUSSION.

DR. GRAHAM said that Dr. Caille's paper called attention to facts that had only come to their notice during the last two or three years, namely the possibility of a foreign body gaining access to portions of the lung. He had had three cases that fell into the same category as those that Dr. Caille had reported in that the possibility of the presence of a foreign body had not been suspected. It was well to have the attention of the profession called to this possibility.

DR. MILLER related the case of a body who was admitted to the ward with a spasmodic cough, fever, coarse râles and all the signs of lobar pneumonia on the right side. After three or four days the

boy coughed up a tack and there was a rapid disappearance of his symptoms.

DR. KOPLIK related two instances somewhat similar to those already cited, and said that if the x-ray did not reveal the presence of a foreign body where one was suspected of being present it was wise to make an examination with the bronchoscope.

MENINGITIS IN THE NEW-BORN, WITH REPORT OF A CASE.

DR. CHARLES HERRMAN, New York, reported this case. He stated that meningitis in the new-born was rare. In an incomplete search of the literature he had found only eight cases with postmortem and bacteriological examination. After briefly reviewing the history of these cases, the essayist said his own case occurred in a baby born in the Lebanon Hospital on November 13, 1914. The child was normally delivered and while in the hospital presented no unusual symptoms. The day after leaving the hospital the baby was admitted to Dr. Herrman's service in a cyanotic, limp and apathetic condition. The physical examination showed nothing abnormal, no symptoms suggesting the possibility of meningitis, so, that a lumbar puncture was not done. The temperature became subnormal, the child more cyanotic, breathing more irregular and death occurred on the following day. Examination by Dr. Riegelman, the coroner's physician, showed on opening the skull thick yellowish-green exudate covering the anterior surface and the base of the brain. It was not uniformly distributed. There was an increased amount of fluid in the ventricles. The exudate appeared to extend to the cord. The thymus was small. Microscopical examination of a section of the brain covered by the pyogenic membrane showed that the parenchyma was infiltrated with numerous round cells and the vessels were injected. The lungs were congested and many air vesicles were filled with blood and endothelial cells. Cultures from the meningeal exudate showed the pneumococcus. The case was interesting because it was the only case of pneumococcus meningitis in the new-born which had been reported, on account of the absence of fever, and on account of the entire absence of meningeal symptoms. Infection in these cases might take place through the placental circulation, by premature respiration, or at birth, through an injury to the skull; or after birth through the eyes, ears, throat, gastrointestinal tract, umbilicus or genitals. The *B. coli* was the most common causative agent in these cases and this made it seem possible that infection took place through contaminated water in the bathing tub.

DR. SEDGEWICK said that meningitis in the new-born was more frequent than had been indicated. The reason it had not been more frequently recognized was because in a maternity hospital the baby was a secondary consideration. This was only one of the occurrences that served to emphasize the necessity of providing proper pediatric care for infants. The ideal arrangement would be to have a pediatric department in connection with the maternity hospitals. Schau-tar's Clinic was the only one that he knew of where this was done.

If they had this opportunity to study the new-born he felt sure they would learn many interesting things.

DR. KOPLIK said he had seen several cases of meningitis in the new-born. He had seen one in which the child on the sixth day had a pyelitis due to colon bacilli and a colon meningitis; this child lived eight months but developed hydrocephalus. So far as he could remember the cases that he had seen in the new-born were due to the streptococcus. In one infant six weeks of age the meningitis seemed to be due to a bacillus somewhat similar to that of typhoid. Many of these cases were not diagnosed or were diagnosed as sepsis.

DR. LEFETRA wished to emphasize what Dr. Koplik and Dr. Sedgewick had said, namely, that these cases were much more common than they had been led to believe. Dr. LeFetra had read a paper before the New Jersey Pediatric Society in which he had reported a number of cases of meningitis in the new-born which had come under his observation at Bellevue Hospital. He had seen another recently which he had not reported. In these cases the symptoms of meningitis were not prominent; the symptoms were rather those of sepsis. Sepsis was not accompanied by a high temperature, but, on the contrary, the temperature was low, not over 99.5° or 100° F. Another symptom of meningitis in the new-born was the marked cyanosis and the fontanelle was not distended. Hence, the symptoms of meningitis might be taken for those of general sepsis in these cases. Sometimes the colon bacillus was the infecting agent and they had also found a bacillus resembling the typhoid bacillus. In cases in which there was a marked cyanosis a lumbar puncture might be advisable, not on account of the meningitis but on account of the possibility of hemorrhage which might be amenable to treatment.

DR. HERRMAN said that he believed, with Dr. Koplik, that meningitis in the new-born occurred more frequently than he had mentioned and that there were many cases that were never reported. As to the control of the new-born, the pediatricists should have the care of the new-born infants and they might then study methods for the prevention of infant mortality to greater advantage, but the obstetricians did not wish to give up what they had. All the cases of meningitis in the new-born that he had reported were under three weeks of age; if he had taken those under three months the number would have been much larger.

AMAUROTIC FAMILY IDIOCY IN ONE OF TWINS.

DR. CHARLES HERRMAN, New York, reported this case which occurred in a child first seen when twenty months old. He said that she presented the characteristic symptoms of amaurotic family idiocy, could not sit up or hold her head up, did not grasp or follow objects and her face was expressionless. The circumference of the head was about 19½ inches. The pupils reacted sluggishly to light and the fundus showed the optic atrophy and the characteristic cherry-red spot at the region of the maculolutea. The abdomen

was distended and the patient markedly constipated. The extremities were spastic and the reflexes increased. The child also had very frequent convulsions, often ten a day. There was fibrillary contraction of the upper eyelids, a peculiar snoring respiration and some difficulty in swallowing. Hirsch some years ago held that the changes in the central nervous system in this condition were due to toxic substances present in the mother's milk. These infants received the mother's milk only two weeks and it was difficult to see why it should be toxic for one child only. Amaurotic family idiocy was an abiotic family disease. These infants were born with a central nervous system that lacked vitality. About 100 cases of this disease had been reported; many more had not been recognized or reported. The writer said he had had eleven cases under observation during the past sixteen years. After discussing the various theories with reference to the etiology the writer expressed the opinion that the disease was not more frequent among Russians than among other nationalities. The large number of patients among children of Hebrew parentage was perhaps due to the rôle played by consanguinity. The mode of transmission could best be explained on the basis of the Mendelian principles of heredity. The unit characters in the ancestry which were involved in amaurotic family idiocy were evidently of the recessive type.

DISCUSSION.

DR. KOPLIK stated that in a case in which amaurotic family idiocy was suspected examination of the fundus of the eye by the ophthalmoscope enabled one to make the diagnosis instantaneously.

DR. HERRMAN said that early in the child's life it was not so easy to make the diagnosis, since at that time the eye changes were not so distinct. The disease was congenital and not acquired, but although the condition was inherited in some instances, the child appeared to be normal for five months and then began to show symptoms. Hirsch later gave up the idea that the mother's milk had anything to do with the production of the condition. It was difficult to explain this case on a toxic theory since the two children had the same nourishment and the same environment and one developed the disease while the other continued to grow in a perfectly normal way.

GENERAL TUBERCULOSIS IN A CHILD INCLUDING THE SKIN.

DR. WILLIAM P. NORTHRUP reported this case which occurred in a baby weighing 9 pounds at birth. The infant was breast-fed. At the age of four months the child was taken with diarrhea and wasting. It had a cough but no vomiting and no crying. The skin eruption and the x-ray enabled him to make the diagnosis of miliary tuberculosis. This was the fourth case of the kind that had come under his observation. The other three he had reported. These cases suggested the following observations. In a case of suspected

miliary tuberculosis, a good x-ray, next to an autopsy, gave the most intimate knowledge of the lesion in a child's lungs. The eruption in miliary tuberculosis furnished a pathognomonic sign for diagnosis. A valuable and almost conclusive point for prognosis was that the skin lesion was almost always an indication that one was dealing with a fatal form of tuberculosis in young children. The histology varied with the acuteness of the invasion. In cases of acute tuberculosis the vesicles (necroses) were the first revealed lesion. Bacilli were found frequently in the blood and in the eruption. The lesion was probably always embolic. The characteristics of the individual lesions were that they were the size of the rose spot in typhoid fever, were tipped by a tiny vesicle, surrounded sooner or later with a congested hemorrhagic zone, followed by the formation of a crust, which, when removed, left a pit. Experience with this eruption was like that with scurvy in infancy, when once seen, the lesion could not be again overlooked.

MACEWEN'S SIGN. AN ANALYSIS OF THE ANATOMICAL CONDITIONS WHICH ENTER INTO THE PRODUCTION OF THIS SIGN AND THE VALUE OF ITS PRESENCE IN DIAGNOSTICATING CHANGES IN INTRACRANIAL PRESSURE.

DR. HERBERT B. WILCOX, New York, stated that the observations recorded in this paper were made in Dr. LaFetra's service at Bellevue Hospital. Macewen's sign was best determined by the stethoscope placed on the forehead just above the base of the nose. The skull was tapped, directly, with the percussing finger or hammer over the parietal region, beginning just over the parietal boss from which the percussing finger should approach to point at which the stethoscope was applied. This should be carried out on both sides of the head. A typical sign observed in this way consisted in a high-pitched, sharp, short cracked-pot note. It was most distinct when percussion was being done over, behind, or below the parietal bone on either side, was unchanged as the point percussed passed downward and diminished in intensity and character as the point percussed approached the stethoscope. The latter point was important and was valuable in differentiating between a false and a true Macewen's sign as the reverse obtained in percussing a normal skull. After a study of skull percussion in a large number of infants in health and disease, the essayist concluded as follows:

1. The skulls of children of various ages and development have percussion notes peculiar to the state of the cranium.
2. It is possible to establish a note normal to the various types of crania found in infants and children.
3. A positive Macewen's sign exists when variation from the normal note was found. It consisted in a relative change rather than a definite condition common to all diseased crania.
4. The sign was better elicited by the stethoscope than by the unaided ear.
5. Increased clearness of sound when percussion was done over the posterior portion of the skull rather than near the stethoscope was diagnostic.
6. The sign uniformly accompanied

conditions of increased intracranial tension and was not found unless this causative factor existed. 7. It is equally applicable to infants and to older children. 8. It was present in fifty of fifty-three cases of tubercular meningitis. 9. It was present in seventeen of eighteen cases of meningitis of other types. 10. It was found to vary directly with the development and recession of cerebral symptoms as complications of disease not directly affecting the central nervous system. 12. It was present in eleven of thirteen cases of pneumonia, in five of which lumbar puncture showed increased cerebrospinal fluid under pressure. 13. The sign was uniformly lacking in children normal as to the brain and its coverings.

DISCUSSION.

DR. LAFETRA wished to congratulate Dr. Wilcox on the persistence with which he had worked on this sign which for many years had been thought of no value. It required very careful attention to the points which Dr. Wilcox had brought out in order to distinguish between the true and the false signs. These points Dr. LaFetra reiterated, and in closing said he hoped Dr. Wilcox would continue his investigations as this sign might be important in giving an indication as to when one should draw off spinal fluid in cases other than meningitis.

DR. KOPLIK said he had used Macewen's method and found it useful in indicating a beginning tuberculous meningitis and in serous meningitis due to otitis. Much depended on the ability of the individual to apply this method. He had found it presented the greatest difficulty in children who had had rachitis and a little hydrocephalus and as they grew older developed cerebral disease. The older the child the more valuable was the sign.

A PRELIMINARY REPORT ON THE PNEUMONIAS IN CHILDREN, WITH SPECIAL REFERENCE TO ITS EPIDEMIOLOGY.

DR. GODFREY R. PISEK, New York, discussed the finding in 1000 cases of pneumonia from the wards of the Post-Graduate Hospital and presented mortality tables and others showing the results of plate culture of the sputum of children. He discussed the varieties of pneumococcus in connection with the work of Dr. Cole and the results of Dr. Gillespie's investigations and summarized his paper as follows:

From a study of 1000 cases we have established a mortality of 34.3 per cent. It was admitted that this was probably a higher rate than obtained in private practice among well-to-do people, but was the average for the mass of city dwellers. Bronchopneumonia was preeminently a disease of the first two years of life, and after the third year was relatively uncommon. Lobar pneumonia was the type of the disease which was present after the third year in practically all cases of pneumonia, if those cases which were frequently secondary to some other condition, such as the infectious diseases or where

the pneumonia occurred as a terminal infection, were omitted. Lobar pneumonia *per se* was a common condition in the first and second years of life, being much more frequent than was commonly supposed. The infection which was the etiological factor of lobar pneumonia, was always the pneumococci, while a bronchopneumonia might be due to a number of organisms such as the streptococcus or the influenza bacillus, occurring alone or as a mixed infection. If pneumococci were present in bronchopneumonia they were usually one of a group of organisms commonly found in the mouth. The pneumococci might be divided into four general groups, each being made up of many races which were closely related. By the method outlined, a pure culture of pneumococcus might be obtained from the group and determination completed within about twenty-four hours from any given case of pneumonia. The division of the pneumococci into groups was of great importance from the standpoint of treatment. Obviously the treatment of lobar pneumonia due to pneumococcus of Group II with a serum or vaccine prepared from an organism of Group I was a waste of energy and might be positively harmful in its effect. Pneumonia was the most common, the most fatal, and the least studied disease that occurred among children. Any work which brought new facts relating to its treatment or new possibilities of improved methods and prevention was worthy of the careful consideration of all those who were interested in the welfare of children. It was hoped that the division of pneumonia into groups would eventually bring about the treatment of specific sera or vaccines, replacing the symptomatic treatment of today. A point of interest in this series was that empysema was not a frequent complication of pneumonia. In all there were forty-one cases of empyema of which five followed bronchopneumonia and the others occurred as a complication of lobar pneumonia. A careful scrutiny of this series of cases failed to reveal any evidence of an epidemic, or even a house infection.

DR. E. E. GRAHAM said that Dr. Pisek had said that forty-one cases in his series of 1000 developed empyema. It had been his experience that the percentage of empyemas varied from year to year. Dr. Pisek also said that in his series of empyema the mortality was 63 per cent. and that certainly was different from his experience with empyema in lobar pneumonia. It made a great deal of difference whether the patients were those in a hospital or those met with in private practice, but it seemed to him that in his experience he must have had 63 per cent. of recoveries. Dr. Graham also asked whether in children under five years of age it was their practice to resect a rib in empyema.

DR. JULIUS P. SEDGEWICK said there was one point which he wished to bring out and that was that the mortality of pneumonia was very different in different parts of the country. There was a higher mortality in Chicago than where he lived. In Minneapolis Dr. Barrett had a series of 125 cases without a single death. He himself had had thirty-six cases with only one death and that was in an old man who had complications. In Minneapolis the mortality from pneumonia

in infants and young children was almost *nil*. He thought the fact should be recorded that the mortality from pneumonia was much lower in that part of the country.

† DR. A. D. BLACKADDER, of Montreal, said a high mortality from pneumonia was not their experience in Montreal.

DR. PISEK said that Dr. Graham's remarks were borne out by the statement made in the paper that the critical cases were sent to the hospital. When a patient at the fifth, sixth, or seventh day was doing badly he was sent to the hospital and that increased the mortality in the hospitals. The empyema cases that succumbed were usually under eighteen months. Much depended on the activity of the surgeon. Conservative surgery gave a young child a better chance. The children in the outlying district who were in a better environment stood the disease better than those in the city living under less favorable conditions.

AN UNUSUAL CASE OF CONGENITAL HEART DISEASE, WITH
DEMONSTRATION OF SPECIMEN.

DR. JOHN LOVETT MORSE, of Boston, said that the child from whom this specimen was taken was born January 1, 1906, and weighed only 3 pounds. There was a definite history of cyanosis since the child was four months old. When the child was four years of age the lips and nails were blue and there was general cyanosis when he cried, and some bulging of the precordium.

There was no distinct murmur though one physician who examined the child said he heard a slight murmur. In November, 1914, the child became ill. The blood picture showed 120 to 140 per cent. hemoglobin, 11 to 12 million red blood corpuscles, 8 to 12 thousand white blood cells, 82 per cent. mononuclears and 68 per cent. polymorphonuclears. The child had high fever and vomiting but no thrill and no definite murmur. Dr. Howland saw the child at this time and said he heard a slight murmur. The child then developed a diastolic murmur and later a systolic murmur. The temperature became elevated, liver enlarged, blood pressure 120 in systole and 50 in diastole, and the child died suddenly of embolism. They did not make a distinct diagnosis but said "endocarditis implanted on congenital heart disease."

In brief the heart had two ventricles and two auricles and an opening in the ventricular septum. There was a transposition of the great vessels with atresia and some malformation. There were three patent valves. Dr. Morse said he had been told that there were only five cases like this one on record.

DR. NORTHRUP said he had reported a similar case before the New York Pathological Society some years ago.

DR. HOWLAND said he had seen the child from whom the specimen was taken in life and the murmur was very mild. It was interesting to find a diastolic murmur in a congenital condition; since in congenital conditions the murmur was usually systolic or continuous. The child probably had an acute endocarditis engrafted on the congenital

malformation. He had seen one or two children with diastolic murmurs and always wondered what the lesion of the heart might be. Dr. Howland related the history of a case which came to autopsy in which the right ventricle was practically only a conus arteriosus and the left ventricle was entirely below the right and was very small. In this case there was only a systolic murmur.

MYELOGENOUS LEUKEMIA IN AN INFANT NINE MONTHS OLD.

DR. J. MASON KNOX, Baltimore, reported this case. The history of the child was negative until two weeks before her admission to the hospital. Severe symptoms came on five days before her admission suddenly and without prodromata. They consisted in nausea, vomiting, diarrhea, described as fecal, fluid, mucous but with no blood; some fever and a cough that had persisted for two weeks. The physical examination was unimportant for the most part. The condition of the child remained about the same for ten days and then became decidedly more serious and progressively worse. The symptoms pointed to gastrointestinal intoxication usually with gastric irritability. The report of the blood examination showed a moderate secondary anemia. There were 200,000 leukocytes and the differential count showed the presence of a large number of myelocytes from the bone marrow. The platelets were about normal and there was no fragility of the cells. The polymorphonuclears were young, often with scanty granulations and showing all transitions to myelocytes. The lymphocytes were mostly of the typical small variety. The picture resembled chronic myeloid leukemia except for the predominance of atypical granulations in most of the myelocytes and in the high percentage of small leukocytes probably due to the age of the patient. In this case the atypical granulations seen in the neutrophilic myelocytes and the presence of eosinophiles and basophilic varieties was good evidence of primary disease of the blood-forming agents.

DR. BLACKADDER related the history of a case somewhat similar to the one reported by Dr. Knox. This child had a very slight rise in temperature, respirations 34, pulse 130 and the blood examinations showed very rapid changes in the blood picture. He was puzzled to know whether the case was similar to that of Dr. Knox or whether it was a case of food intoxication.

DR. KNOX said the lesson to be drawn from these cases was that in cases of persistent nausea and vomiting the blood should be examined early in the course of the disease.

THE HYDROGEN ION CONCENTRATION OF THE GASTRIC AND DUODENAL CONTENTS IN CHILDHOOD.

DR. JULIUS PARKER SEDGEWICK, Minneapolis, Minn., presented this study. He said that until recently they had been satisfied with the determination of the acidity of the body fluids by the titration method. This method was unsatisfactory since it determined only

acids plus salts of weak bases in a solution. It was not a measure of the degree of acidity or alkalinity of that solution. The writer reviewed the work of various investigators with reference to hydrogen ionization and described the methods commonly used for determining the hydrogen ion concentration of fluids, namely, the gas chain method which was accurate, and the indicator method. The former was the one best adapted for research work because of its greater accuracy. The duodenal contents were obtained by the Hess catheterization method. A summary of the work warranted the following conclusions: 1. The results of other observers which showed a low acidity of the gastric contents of infants during the height of digestion was confirmed. 2. The sharp rise of acidity of the gastric contents of infants toward the close of digestion was shown. 3. The gastric contents of a new-born infant before food was taken were very acid. 4. The duodenal contents of infants obtained by the Hess method were not alkaline, but showed hydrogen ion concentrations of from 79.5 to 0.9 times 10 - 5.

DR. GERSTENBERG asked Dr. Sedgewick what he had fed the infants. Were they artificially fed or breast fed?

DR. SEDGEWICK replied that one was artificially fed and the others were breast fed.

DR. GERSTENBERG asked if there was decided difference between the artificially fed and the breast-fed infants in hydrogen ionic concentration of the gastric and duodenal contents.

DR. SEDGEWICK replied that there was not a great difference.

REPORT OF COMMITTEE ON CHILD LABOR PROBLEM.

DR. PHILIP VAN INGEN, New York, presented this report. He first told of the difficulties that beset the investigator along these lines, since so little material was available for in the way of statistics that could be relied upon. They had endeavored to collect data with respect to the various kinds of labor in which children were employed and to what extent they were employed. They could only report progress. The question of the various occupations that children were engaged in brought up medical questions upon which they had no data. So they had begun an investigation of the subject of fatigue and its results, mental and physical, upon the development of the child and upon the mature organism. They had studied occupations with reference to mortality, to susceptibility to certain diseases and the effects in this connection of race and heredity. Direct evidence of the effects of different occupations on the children engaged in them practically did not exist. They had collected a good deal of material but would have to go a long way to get at the facts.

REPORT OF THE COMMITTEE TO COOPERATE WITH THE FEDERAL BUREAU.

DR. HAMILL reported that the Federal Bureau had consulted them in a number of instances and that the Committee had given this

Bureau advice on certain subjects upon which they wished to have medical opinion.

SOME INTERESTING FACTS PLAINLY BROUGHT OUT BY A CHART
METHOD OF STUDYING AND MANAGING CASES OF DIABETES
MELLITUS IN CHILDREN.

DR. DEWITT H. SHERMAN, of Buffalo, presented these charts which he said gave in the quickest and easiest way a fund of information concerning a case. In many febrile diseases valuable impressions were often gained if the whole course of the temperature was before ones eyes and this also applied to other diseases of long duration, such as diabetes mellitus. The charts presented told one what he had done, when he had done it, and the results. The upper half of the charts showed in unbroken lines the number of grams of each of the three food elements ingested and their total caloric value. The lower half showed in broken lines the urine analyses and hence the condition of the patient on a given diet. Colored crayons were used to bring out a number of other facts. By this system, as shown by one case traced out, the author learned that the patient could be sugar free on meat, eggs and butter, but as soon as fodder food, such as onions, was given she passed four-tenths as much sugar in the urine as she had ingested carbohydrates in the onions. While she tolerated meat and eggs well, when fish was added the amount of sugar which appeared was about one-sixth of the amount of fish ingested. The acetone in this case was always present and gradually increased on all diets and this showed that the patient was losing ground. As the acetone increased so did the ammonia nitrogen which was another sign of unfavorable progress. A study of this chart with reference to the occurrence of cyclic vomiting brought to his attention the possibility that one might find sugar in the urine in such cases just before an attack more often than had been suspected, and that it was due to the same faulty metabolism that caused the vomiting. He had also learned that an excess of fat might in itself cause sugar to appear and that high fat might be a cause of cyclic vomiting. At another time they had found that an increase of sugar in this child was due to worry, because for weeks she had been doing something she knew was not right.

DIFFERENTIAL DIAGNOSIS OF STENOSIS AND SPASM OF THE PYLORUS.

DR. ALFRED HAND, Philadelphia, stated that there were no more difficult problems in diagnosis than those pertaining to the abdomen in infancy and early childhood. With the greater activity of the digestive functions at this early age disturbances were likely to occur which closely resembled some one or more of the organic affections. There seemed to be a tendency to use the term spasm of the pylorus too frequently as though it were a distinct clinical entity, while the underlying condition in many cases was probably not so much a failure of the pylorus to relax at the proper time, as it was a gastric

indigestion due generally to improper feeding. Still they did not meet with instances of vomiting after almost every feeding associated with obstinate constipation and failure to gain in weight with dilatation of the stomach and perhaps visible peristalsis, in which, while there was evidently gastric indigestion, it did seem as though the vomiting did not depend entirely on the indigestion, but that the tonic condition of the pylorus was also present, allowing little if any of the stomach contents to pass into the duodenum. The first case of this kind which came under his care (after he had witnessed a pyloroplasty following which the infant succumbed within twenty-four hours) was one in whom the history was very suggestive of pyloric stenosis but on examination he was unable to demonstrate a lump anywhere in the abdomen, and he could never satisfy himself that peristalsis was visible. Influenced by the fact that the infant was only two months of age and that an enema sometimes brought away fecal matter he determined to try dietetic care for a while longer. Progress was very slow, but in the second year nutrition finally became very satisfactory. It was difficult to classify this case. During its progress the writer was of the opinion that it was a case of pyloric hypertrophy with a sufficient degree of patulousness to allow of slow general development and either the body grew up to the hypertrophy or it actually disappeared, if that was ever the case. The question also arose as to whether it was a pure case of pylorospasm, or one of gastric indigestion with spasm, the indigestion being gradually overcome by the dietetic measures, and the spasm ceasing with the removal of the exciting cause. Following this case five others were seen, in four of which peristalsis was visible, and in one a skiagraph showed a complete retention of bismuth in the stomach until it was vomited. A tumor could not be felt in any of them. The results in these six cases which lacked only the palpable tumor to establish the diagnosis of congenital hypertrophy of the pylorus had made the essayist incline to the belief that the genuine condition itself was amenable to dietetic treatment. Dr. Hand also related the history of a case in which the conservative course of treatment failed to produce any progress and after three weeks in which there was no gain a posterior gastroenterostomy was performed by Dr. Deaver. The patient made a prompt and gratifying recovery. Hence, he felt that the diagnosis of hypertrophic stenosis was established and operation indicated in this case, but in the absence of a mass, even if there was visible peristalsis and projectile vomiting and failure of the bismuth to pass the pylorus during an x-ray examination, it was advisable to persist in dietetic treatment with further observation. Even if one could only keep the weight stationary the patient was growing older steadily with a possible increase in the chances for surviving an operation, should it be deemed necessary later.

DR. HARRY DEAVER, of Philadelphia, spoke of the surgical side of the subject of pyloric stenosis in children. He stated that the number of cases of pyloric stenosis that were being reported was increasing. The condition was interesting because of the obscurity of its

etiology, the difficulty of recognizing the cases and the diversity of opinion as to the treatment. The symptoms were projectile vomiting, constipation, visible peristalsis and steady loss in weight. The vomitus showed no bile. The urinary output was diminished. If there was a tumor and the peristaltic wave was seen moving from left to right every minute or two, one could not be mistaken in the diagnosis. When this condition was present the child usually succumbed in from four to six weeks. A number of theories had been advanced to account for this condition. The x-ray was sometimes a great help in diagnosing pyloric stenosis. Where operation was necessary gastroenterostomy was the operation of choice, and an early operation offered far greater hope of recovery than a delayed one. It had been his experience that children stood operation well and when operated upon early all recovered. Out of six cases he had two deaths and both of those were in infants greatly emaciated. One never felt a palpable mass in a case of pylorospasm. If the child cried when an attempt was made to palpate a tumor he never hesitated to give a whiff of ether. The operation in an infant was a very delicate one because the walls of the jejunum were very thin. The jejunum should be jointed to the stomach without any loop as close as possible.

DR. HERRMAN said that the point had been made that the presence of a palpable mass was indication for an operation, but many cases in which a mass was palpable got well without an operation. As to pure pylorospasm, these cases had never been proven to be pure spasm without any change in the pylorus. Projectile vomiting was not a characteristic upon which one could base a definite diagnosis. Pylorospasms and stenosis were not two distinct conditions, but were different degrees of the same condition. The prognosis depended on the degree of stenosis. Dr. Herrman said he had had two patients for whom he had advised operation. This was refused and the children recovered without any operative interference. As to the operation, the favored method at present was to simply divide the mucous membrane without going into the stomach and to sew at right angles.

DR. COIT said he wished to sound a note of warning against a too great readiness to submit these children to operation. He related at length the case of an infant whose symptoms were indicative of pyloric stenosis and such a diagnosis was confirmed by the x-ray, yet under careful medical treatment the child recovered.

DR. GRAHAM said the question of diagnosis rested on the gravity of the symptoms. There seemed to be so much confusion as to the indications for operation, that it seemed best to be guided by the severity of the symptoms.

OFFICERS FOR ENSUING YEAR.

President, DR. ROWLAND G. FREEMAN; *Vice-President*, DR. J. C. GITTINGS, Philadelphia; *Secretary*, DR. SAMUEL S. ADAMS, Washington, D. C.; *Treasurer*, DR. CHARLES HUNTER DUNN, Boston, Mass.; *Editor and Recorder*, DR. L. E. LA FETRA, New York City.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Pathological Anatomy of Tuberculosis in Children.—B. Roman and A. Ghon (*Jahrbuch f. Kinderheil.*, Feb. 8, 1915) considers the causes of the clinical and anatomo-pathological differences of tuberculosis in children and in adults. The type of tuberculosis generally seen in adults may be found in children, and that of children may be seen in adults. The author has tried to investigate the causes of these differences by observing cases of tuberculosis in children and to answer the question of the propagation of the process from primary lung lesions outward, and from primary lung lesions to those of other organs. He has examined six typical cases of pulmonary tuberculosis and made careful autopsies. He divides these cases into two groups of three each: In one group there is a tendency to recovery; in the other this tendency is absent. The type of non-recovery is the one more often seen in young children. In older children the healing type is more frequent. In the nonhealing group hematogenous infection of other organs was shown in two cases of meningitis. In one of these there was found a sparse miliary tuberculosis of liver and spleen. In two cases the lymphogenous current of infection had reached the veins. In another the upper tracheo-bronchial glands had not yet been passed. In the healing group of three cases, two showed recrudescence of the process; there was localized tuberculosis in one-half of the chest, but no data to show hematogenous spread. In the other case tuberculosis of lungs, trachea, larynx, and intestine were of hematogenous origin. Tuberculosis of the lymph glands of the chest and retrocardiac space was of lymphatic origin. Group 2 shows an entire failure of any attempt at repair of lesions. Nowhere were there signs of healing. The process was continually progressive. We learn, then, that the port of entry of the bacillus and the method of spread by way of the lymph channels is of importance. This is the more frequent type of disease in young children. The second group showed a tendency to healing. They were older children, and the spread of the lesions had ceased. Most interesting was the relation between the progressive changes and the healed or healing ones. When two lesions are present only one can be the primary one. The other must be secondary, and due to aspiration of the primary mass. One set of lesions may show a tendency to healing, while another shows at the same time a tendency to increase of lesion. It is important to get autopsies of a long series of cases of pulmonary tuberculosis in adults and children and find whether there are traces of an earlier tuberculosis before the lungs were attacked. On anatomical grounds we must distinguish between

cases with a typical pulmonary tuberculosis from an old lung infection, and similar changes in the lymph glands in cases without these changes, the lung condition being primary.

Beestings and Bee-poison as a Therapeutic Measure in Chronic Rheumatism of Children.—Joseph Langer (*Jahrbuch f. Kinderheil.*, March 8, 1915) says that the pediatricist seldom encounters chronic rheumatism in children, in whom the acute form is most frequent. One sees centrifugal and centripetal forms of chronic rheumatism of deforming type, rarely with heart complications. The joint lesions are always symmetrical, which favors the theory of a trophoneurosis. The joints and surrounding tissues are swollen, stiff, almost paralytic, shining and tender. Pain prevents active and passive movements of the joints. Such children are entirely helpless. The etiology of this disease is not settled. The therapy includes all sorts of general medication, which goes to show that we are dealing with a fault of metabolism at present not understood. The writer gives histories of three cases treated by him with bee-poison. The treatment is exceedingly painful and is therefore seldom applied to children. But Turc and his followers have formulated a regular system of treatment by this method. It is carried out for long periods and large numbers of bees are applied to the same patient at one treatment, as many as 150 beestings being received at one sitting. The points of the stings appear after a few days as points of necrosis with a wall of leukocytes built around them. Injection of bee-poison into the conjunctival sac causes swelling of lids, closure, hyperemia, chemosis, and purulent exudation. The beesting is a slightly diffusible poison causing inflammatory swelling. It acts as a counterirritant to the tissues beneath it. The thickening of the circulation causes a carrying away of disease products and may kill the germs causing the disease. The bee-poison is also a bacteria-free secretion with the power of killing bacteria. The author obtained an extract of bee-poison by removing the sting and macerating in water. This he used in children as an injection, this method proving less painful than the beestings themselves. His conclusions are these: The bee treatment after Turc is very painful. The direct influence of bee-poison in rheumatism is doubtful. The claim of Turc that the reaction of the chronic rheumatic patient is different from the normal is established. That an immunity to bee-poison is established has not been proven by the author. The good effect of the poison on rheumatism seems unquestionable. In none of the author's cases was there any bad effect. The injection of the author's solution of bee-poison was not severely painful.

Atonic Form of Cerebral Diplegia.—Foerster described, in 1909, a new type of cerebral diplegia and gave detailed descriptions of four cases. The main characteristic of this condition is an extensive hypotonia of the voluntary muscles of the body as shown by a large degree of undue passive mobility of the various joints. This hypotonia may be so extensive that even the muscles of the head and neck are affected. There is complete inability to stand, walk, or even to sit without support. There is no power of fixation, owing to deficient

action of the antagonistic muscles. When lying in bed the children are well able to move the limbs, though the movements are somewhat sudden. The tendon reflexes are present and the electrical reactions of the muscles normal. In one case there was hypotonia of the legs associated with a spastic condition of the arms and extensor response of the right plantar reflex. There were also occasionally opisthotonos and choreic movements of the face and tongue. Pierce Clark, in 1913, described a similar condition under the name of cerebocerebellar diplegia. F. E. Batten and W. H. von Wyss (*Brit. Jour. Child. Dis.*, 1915, xii, 65) report four cases which had in common a hypotonic condition of the voluntary muscles of the body, especially of the lower limbs, and a deficiency of the synergetic action of the muscles, as shown by the inability to stand or walk, but no loss of power in performance of active movements. One case showed a marked degree of ataxy, characterized by a lack of proportion of the movements (dysmetria of Thomas). In two of the cases there was also a certain amount of hypertonia, as evidenced by adductor spasm and overflow of the abdominal reflexes, in one case there was an occasional extensor response of the plantar reflexes. There also was in two cases rigidity of the lower limbs in a certain position, namely, when the children were suspended by the axillæ. Not one of these cases showed the extreme hypotonia described by Foerster with the exaggerated flexibility of the trunk, head, and neck. Two of the children were markedly mentally deficient and mute. According to the statement of the parents these children had shown progressive degeneration. The most interesting feature of this group of symptoms is the loss of tone and synergetic power associated with well-preserved active movement. Foerster, who expected a cerebellar lesion, found in two cases in which he obtained a postmortem examination a sclerosis of the frontal lobes with macroscopically intact cerebella. There is no microscopic evidence, and there is nothing known of the conditions of the olives and the vestibular nuclei and the nuclei of the tegmentum. We may be justified in supposing a gross cerebellar defect in the case with cerebellar ataxia. In those cases where there is hypertonia as well as extensor response of the plantar reflex we will probably find that the pyramidal tracts are affected as well. No satisfactory explanation can be given why the hypertonia is brought on by the suspension of the children by the axillæ. It is a kind of reflex spasticity.

Relation of Contracted Pelvis to Hydrocephalus Developing after Birth.—Consider only those cases which appear normal at birth, but soon thereafter show abnormal cephalic development. R. J. E. Oden (*Jour. A. M. A.*, 1915, lxiv, 816) records an instance in which two successive children developed postpartum hydrocephalus, when both parents were free from stigmata of disease, but pelvic mensuration of the mother revealed a contracted pelvis. A third child, delivered through a Cesarean section, showing no abnormal symptoms several months later, is an additional argument for the possibility of a contracted pelvis being the prime causative factor in many cases of postpartum hydrocephalus.

Schick Toxin Reaction for Immunity in Diphtheria.—J. A. Kolmer and E. L. Moshage (*Amer. Jour. Dis. Child.*, 1915, ix, 189) report their results in over 1200 cases. They find that the toxin skin reaction is a valuable and reliable method for detecting susceptibility to diphtheria. Persons reacting negatively to this test usually contain at least one-twentieth unit of diphtheria antitoxin per cubic centimeter of serum, and this amount of antitoxin is probably sufficient to protect against infection. Persons reacting weakly or strongly positive usually contain less than one-fortieth of a unit of antitoxin per cubic centimeter of serum or none at all. These persons may be regarded as susceptible to diphtheria and in the event of exposure to infection should be passively immunized with an injection of antitoxin. About 40 to 50 per cent. of children ranging from one to fifteen years of age react positively to the toxin test; this means that the preliminary use of the toxin test will eliminate the necessity of administering prophylactic doses of antitoxin to about 50 per cent. of children. The toxin reaction indicates that the immunity conferred by an injection of antitoxin begins to disappear after ten days and has generally passed away entirely after four weeks. The increased susceptibility of persons with scarlet fever to diphtheria is shown by the toxin reaction; even after the injection of antitoxin about 10 per cent. are susceptible within ten days. According to the toxin reaction the immunity conferred by an attack of diphtheria is usually of short duration or entirely absent. The most practical application of the toxin reaction consists in applying the test as a preliminary measure to all persons who have been exposed to diphtheria and immunizing only those who react positively.

Studies in Fat Indigestion.—As to predisposing causes for fat indigestion, C. H. Dunn (*Amer. Jour. Dis. Child.*, 1915, ix, 225) has been struck by the frequency of some evidence of tuberculosis or syphilis in these cases, especially tuberculosis. In extremely few instances is there any history of previous overfeeding with fat. In general, the history in these cases is one of overfeeding with carbohydrate. This finding is interesting in connection with our theories as to the cause of fat intolerance in artificially fed babies. The effect of long-continued fermentation from overfeeding with carbohydrate may well be a failure of the power of digesting fat, the carbohydrate injury being primary, but the fat indigestion coming to dominate the picture. We can compensate for deficient fat digestion by the giving of more carbohydrate and protein, to only a very slight extent. In cases in which the patients are gaining, one should make frequent examination of the stools for fat, and if the quantity of soap does not lessen or increases, the fat must be cut down, even if the babies have to undergo a further period of failure to gain, or even of loss in weight. Free fat in the stools should always be a positive indication for cutting down the quantity of fat in the food. In general, cases of fat indigestion do better with maltose than with lactose, and Dunn believes that the chief value of maltose in these cases is that it is the best carbohydrate to replace the deficiency of fat—to meet the caloric need created by the fat intolerance. The question of the value of

precipitated casein is of interest chiefly in connection with the possible rôle of the cow's milk salts in cases of fat intolerance. The majority of Dunn's cases in which precipitated casein was tried did not do better than with the regular form of protein. His results have been rather against the rôle of the cow's milk salts in producing fat indigestion, but this is still an open question. Lactic acid milk has not been sufficiently studied to afford the drawing of even provisional conclusions in fat indigestion. The writer has not as yet found evidence of its value. He gives the following summary of the ideas now held at the Infants' Hospital as to the treatment of severe cases of fat indigestion: The milk modifications used must be low in fat, average in carbohydrate, comparatively high in protein. The extra sugar should be maltose. A certain number of the milder cases will do well on this treatment. Severe resistant cases are those in which the patients cannot gain on a low quantity of fat and cannot tolerate an increase. A large number of cases are so severe and resistant that they can be saved only by human milk. Breast milk will save most of these cases, even the severe ones, if used in time. It should always be used in resistant cases, whenever it can be obtained. Even a little breast milk is of value, and may save a patient that would otherwise be lost. After a period of breast-milk feeding, many cases are found no longer severe and resistant to artificial feeding. If breast milk cannot be obtained, the feeding is very difficult and the outcome uncertain. Excessive increase of carbohydrate or protein will not help these severe cases, and may do harm; not more than 7 per cent. carbohydrate or 3 per cent. protein should be given. Whey mixtures are of no help except sometimes in very young babies who vomit curds; they may do harm. Giving the protein in the form of precipitated casein may be tried, and may help in some cases. There is not sufficient evidence of its value to indicate its use as a routine. The only way of managing these resistant cases without breast milk is to keep the fat low, and we must be prepared for a period of loss of body weight which may be prolonged. If they begin to gain when the fat is increased, it is no sign of permanent improvement; they may go to pieces at any time. Frequent examinations of the stools for free fat and excessive soap must be made. In the presence of free fat, or in the continuous or increasing presence of excessive soap, the fat should be reduced, even if the baby is gaining. If a "blow-up" occurs when the fat is increased, the fat in the food should be reduced to zero, and then worked up again, slowly. Frequent "blow-ups" diminish the tolerance for fat. The best hope of eventually obtaining an increase in tolerance of fat sufficient to permit a gain in weight is to avoid overfeeding with fat for a long time, even if much weight is lost.

Biological Examination of the Intestinal Flora in Infants.—Kurt Bluhdorn (*Monatsschr. f. Kinderheil.*, Bd. xiii, Nr. 7, 1915) says that the antagonism between the putrefactive and fermentative bacteria in the intestine is of the greatest consequence for the normal exchanges, and that albumin and carbohydrates are both causes of fermentation. The carbohydrates cause thin stools, while the albumin

works in the opposite way. We can produce constipation by an albuminous diet and must seek to lessen fermentation by removal of the carbohydrates. The bacterial flora play a varied rôle in the intestinal exchanges which is not yet thoroughly understood. The author has made extensive studies of the action of these bacteria in order to determine how they act in the infant's intestine. He studied the influence of albumin and nitrogen on the bacterial carbohydrate fermentation, and thinks that he has shown the important effect of these substances on the growth of bacteria and carbohydrate fermentation. The greater the amount of nitrogen produced the greater is the demand for sugar. Thus the sugar-rich whey permits less bacterial fermentation than the whole milk. Thus whey is excellent in catarrh of the intestine. Nitrogen acts constantly in the production of acid. The bacteria can in the given time cause fermentation in only a certain quantity of carbohydrates. Through the nitrogen of the food the amount that can be acted on is increased so that an additional amount of sugar disappears with the same amount of albumin. Albumin-poor whey causes lessened bacterial fermentation through lack of nutrition. An acid reaction is favorable to intestinal catarrh from sugar, for the bacilli are unfavorably affected by the presence of acid. In this form of intestinal catarrh the stool has an alkaline reaction which is favorable to bacterial action. These experiments show why we should not give albumins when there are constipated stools, without at the same time increasing the carbohydrates. We also see why with a feeding that contains both albumin and carbohydrates the fermentation process may increase, and how with albumin-poor carbohydrate feeding the fermentation process can be held within bounds and even cause constipation. We have learned the action of acids on the various bacteria. Lactic acid has the most marked effect in preventing bacterial action. Butyric and acetic acids have less action of this sort and phosphoric acid still less. This accounts for the beneficial effect of the lactic acid in digestion. Lactic acid causes little peristalsis while at the same time it lessens the bacterial action and fermentation. Thus the acid reaction of "eiweissmilch" and of buttermilk whose hindering of bacterial action we know, is of more importance because of the presence of lactic acid. Still lactic acid will not absolutely prevent the action of bacteria flora nor the consequent fermentation. The bacterial flora has a relation to the kind of feeding used. Some kinds of flour form a better culture medium for bacteria than others. The same is the case with sugars. Milk sugar is less affected by bacteria than maltose, and cane sugar is less affected by the breast flora than the others.

Parapneumonic Empyema in Children.—Gerhardt recently published five cases of parapneumonic empyema in adults. He points out four characteristics of benign parapneumonic empyemas: (1) Pus develops early in the fever stage of the pneumonia. (2) The course is benign, *i.e.*, the temperature—and pulse—curve and the duration of the pneumonia are unaffected. (3) There are usually no microorganisms in the pus. (4) The amount of pus is small.

L. W. Sauer (*Arch. Pediat.*, 1915, xxxii, 207) records two cases which occurred in young children. One of these shows how little the picture of the pneumonia is affected; also that pus is present within sixty hours after the onset of the pneumonia. Bearing the seriousness of empyemas in young children in mind, it becomes especially important to lay stress on the benign character of the above-described type of parapneumonic empyema, and to warn against hasty surgical interference. Although pus in the pleural cavity means surgical measures to many, such measures are not necessary in this type.

Acute Pyelitis.—E. J. Wood (*Arch. Pediat.*, 1915, xxxii, 199) says that acute pyelitis is being frequently overlooked in infancy because of the neglect of routine microscopic urinary examinations in all cases, but especially when there is obscure fever. While the condition is more frequent in female children, still there are many cases in males which are overlooked. The theory that acute pyelitis is always an ascending infection with the colon bacillus from the soiling of the vulva is losing its hold and other sources, as infection from the colon by way of the lymphatics, is gaining ground. Acute pyelitis is often primary and does not necessarily follow one of the acute infections. Malaria and typhoid are often diagnosed in this condition. The disease responds promptly to the use of potassium citrate through the rendering of the urine alkaline. Hexamethylene amine preparations are most disappointing and their use is to be questioned in infancy.

Benzol Treatment of Lymphatic Leukemia.—A. E. Meyers (*Arch. Pediat.*, 1915, xxxii, 188) records a case of acute lymphatic leukemia with autopsy in a male child four years and three months old treated with benzol. Among the interesting features were the gradual reduction of the white blood cells with comparatively small doses of benzol; the extreme high temperature at the end, making it resemble a terminal infection; and the complete reversal of the picture of the white blood cells as it appears in cases of leukemia not treated with benzol. With the exception of the blood picture there were no other signs of benzol poisoning. As Billings points out, the blood picture, after the administration of benzol, becomes rather complex and difficult to analyze. Gastrointestinal symptoms were absent throughout the entire case. A heart murmur, which was thought to be an anemic one, was found at autopsy to be probably due to an endocarditis and an interstitial myocarditis. Under benzol treatment there was a gradual ascent of the polynuclears and the hemoglobin. The apparent good results were obtained while the patient was receiving benzol minims iii four times daily.

Dietetics of Eczema.—G. D. Lyman (*Arch. Pediat.*, 1915, xxxii, 175) says that on reviewing the results of the dietetic treatment of this condition one realizes the great variety of the claims. Sometimes cutting down the quantity of the food is all that is necessary—the next time just the contrary, and the condition is not improved until the infant is fed up. With other cases neither the one nor the other is successful and help is obtained only by a complete change in the food. In these cases the qualitative and quantitative mistakes of the pre-

vious feedings must be abolished and the food suitable to the conditions present ascertained, so that a normal metabolism and assimilation may be brought about. In the uncomplicated cases of eczema it appears that the fat and carbohydrate percentages are guilty. In some cases the salt assimilation seems to be disturbed. In the more chronic cases, there is often a disturbed protein digestion; still other cases are complicated by secondary and intestinal affections, and an immediate improvement takes place when the infections are healed, and the metabolism approaches normal. In other cases a reduction of the quantity of milk and going over to a mixed diet rich in vegetables and carbohydrate is the only successful means. Local treatment alone or intestinal or dietary treatment alone are unsuccessful. In all cases of eczema it is necessary to make a thorough complete examination of the stools for signs of indigestion, and above all else it is necessary to know and study the individual baby.

Operative Treatment of Cleft Palate.—In the Hunterian lecture, H. Blakeway (*Lancet*, Mar. 6 and 13, 1915) states that in cases of cleft of the soft palate alone, or of the soft palate and a small part of the hard, there is probably little to choose between the results of the operation of median suture and of that of the turn-over flap in cases treated by the best hands; but that in cases of greater severity there is a much better prospect of success if Langenbeck's operation is used at a suitable age by a surgeon accustomed to its performance. Langenbeck's operation is still the best for routine use. The question as to the best age for its performance does not admit of precise answer. It is doubtful if any great advantage results from performing it during the first year of life, and it is certain that the prospect of success during the second or third year will often be better. Further delay is not usually necessary, but may in bad cases be advisable. Surgeons who a few years ago were content to operate in the third year or later now often perform median suture on children one or two years old. The experience of the operator, the width of the cleft, together with the height of the palatal arch and the general health of the child, have all to be considered before a decision is reached. If the condition is complicated by the presence of a harelip closure of the latter during the first few weeks of life has a valuable effect in causing obliteration of the most anterior part of the cleft.

Diphtheritic Paralysis and Diphtheria Antitoxin.—H. Kleinschmidt (*Jahrbuch f. Kinderheil.*, Apr., 1915) has made a study of the occurrence of diphtheritic paralysis with reference to the injection of antitoxin. It has been asserted that the giving of large amounts of antitoxin will prevent paralysis; but it is found that there is paralysis in cases of moderate severity with and without the injection of antitoxin, and that paralysis does not occur only in cases of marked severity. According to animal experiments it would seem that by early injection of antitoxin paralysis might be prevented in light cases, and that those cases in which paralysis occurred in spite of injections were either injected too late, or were due to virulent bacilli, or that the doses were too small. The serum of children who react positively to diphtheria contains no antitoxin, the reaction

being bound up with the presence of antitoxin in the blood serum. The author gives histories of twenty-five cases tested by him, some with slight and some with severe symptoms. All were treated with serum and tests were made three weeks after the injections. After a negative intracutaneous reaction on the fifteenth day, between the twenty-second and fifty-fourth day antitoxin is regularly to be found in the blood, since at that time an active antitoxin production has been initiated. Only four cases were without this action, two of which were severe cases with marked complications. This would naturally weaken the productive power of the organism. In a second series of twenty-five, antitoxin production was absent in twelve. Twenty-two paralytic cases were tested after the twentieth day from the injection, and half of them showed antitoxin in the blood. If the poisoning is held in check by an early and sufficient injection of serum a cure without complications generally takes place. If some of the nerve cells are injured by the poison a nerve degeneration will take place whether antitoxin be present or not. If this nerve injury is slight a cure will still take place, assisted by the antitoxin, but if the injury is great an acute paralysis and death may still result. Toxins that are already produced before the injection may do their work before the serum can act. In paralytic patients antitoxin production is less frequent than in less severe cases. Bacteria remaining in the air passages may continue to cause antitoxin production after the paralysis has begun, and the antitoxin will not prevent the paralysis. After the beginning of the polyneuritis the reaction may cease to be negative. The author's conclusions are that paralysis may occur in spite of the presence of diphtheritic antitoxin and may be fatal; also the diphtheritic paralysis may be cured in spite of the absence of antitoxin. Even early administration of antitoxin in such cases may not be an insurance against polyneuritis. The presence of antitoxin even in large amount is useless after the neuritis has occurred. Death or cure is not dependent on the antitoxin production. Early administration of serum so as to prevent the poisoning of the nerve cells is the best insurance against complications.

Megalocolon and Microcolon.—L. Porter and A. Weeks (*Amer. Jour. Dis. Child.*, 1915, ix, 283) record four cases of megalocolon because they serve to throw light on disputed points, and one of microcolon because it illustrates a condition opposite to megacolon and furnishes an abnormality in the small intestine which in every way parallels the pathological changes found in the large intestine in cases of giant colon. The writers present for comparison the photomicrographs of the giant colon, of the hypertrophied small intestine and of a case of hypertrophic pyloric stenosis. A comparative study of these show nearly identical the muscle and blood-vessel changes are in the three conditions. Certain writers have denied the congenital origin of megalocolon. Cases I and III exhibited symptoms at birth and in Case I a typically developed giant colon was revealed by operation and necropsy. Cases have been reported in which giant colon was discovered in prematurely born children. It has been

questioned whether the sigmoid was narrow in all cases, and it has been asked if the true origin of the dilatation and hypertrophy was not an obstruction that blocked the passage with feces and allowed the work of the intestine and the stress on it to be followed by increased production of muscle and ballooning from the retained gas. Case IV of this series, in which the gigantism included every portion of the intestine to the anus, shows that the sigmoid narrowing is not present in every case. It is probable that megacolon is a more common deformity than is generally thought. The symptoms are present from birth. They are: an enlarged abdomen, visible intestinal peristalsis, obstinate constipation, later, anemia and toxemia from fecal retention, accompanied sometimes by recurring attacks of intestinal obstruction. Pathologic hypertrophy with dilatation may include the entire intestine, or the dilatation may cease at the sigmoid, which will be hypertrophied, but with a narrow lumen. That isolated segments of the large intestine may be affected while most of the intestine remains intact and healthy is to be doubted. Fatal collapse can occur from fecal obstruction, and such obstruction may be brought on by injudicious attempts to empty the bowel. The one measure that promises relief is operative procedure, which may be utilized in either two or three stages: colotomy, with artificial anus (this cannot be done too early in the child's life or in the course of the case), later excision of the entire large intestine with anastomosis from the ileocecal region into the rectum; or anastomosis may be done as a second step and resection of the entire colon be made a third operation.

Nutritive Value of Proprietary Infant Foods.—R. Wheeler (*Amer. Jour. Dis. Child.*, 1915, ix, 300) finds that mixtures of milk and Eskay's Albuminized Food sustain normal growth in albino mice provided the milk furnishes 94 per cent. of the mixture as fed (66 per cent. of solid nutrients). The lack of growth on Eskay's Food without milk appears to be due to two factors: (1) inadequacy of the proteins to satisfy the nutritive requirements for growth in mice, and (2) absence from this preparation of some accessory substance or substances essential to growth. Eskay's Food in milk mixtures, as when fed without milk, produces in mice soft stools and sometimes diarrhea. Mixtures of Mellin's Food and milk also sustain normal growth in mice. Here, too, the milk serves two purposes: to supplement inadequate proteins and to supply essential accessory food substances. A mixture of 93 per cent. Mellin's Food and 7 per cent. purified casein is adequate for long-continued maintenance, but not for growth; 2 c.c. of milk added to the daily ration (4 gm.) of this mixture, makes a food which sustains entirely normal growth in mice. Here, milk furnishes 5.8 per cent. (including casein, 7.2 per cent.) of the total solids of the diet. The feces of animals on a diet of Mellin's Food mixtures were always comparatively hard and dry. A mixture of fresh milk and 6.5 per cent. sucrose also sustained entirely normal growth in young mice. From an economic standpoint at least, this fact deserves consideration.

Studies on Infant Metabolism: Excretion of Magnesium Sulphate Injected Subcutaneously.—Since Meltzer and Auer demonstrated

the narcotic action of magnesium salts injected into the circulation, several clinical applications of this action have been found valuable. The salt has proved remarkably effective in immediately stopping convulsions and reducing the condition of hyperirritability in tetany. As the effect is temporary, however, the injections must in the most severe cases, be repeated on a number of successive days. Because of this necessity it appears highly desirable to ascertain the rate at which magnesium sulphate is eliminated after subcutaneous injection. An accumulation, in view of the toxicity of magnesium salts, could not be regarded without apprehension. A. M. Courtney and H. L. Fales (*Amer. Jour. Dis. Child.*, 1915, ix, 318) have used magnesium sulphate in treating a number of cases of tetany. The magnesium sulphate was in each case injected subcutaneously with a syringe into the cellular tissue of the abdomen. The concentration of the solutions was 8 gm. of anhydrous MgSO_4 (equivalent to 16.4 gm. of Epsom salts) per 100 c.c., the volumes injected varying from 4 to 10 c.c. In brief, their data indicate that the infant organism can incorporate within two successive days as much as one- or two-tenths of a gram of magnesium oxid from the magnesium sulphate injected subcutaneously, and that amounts in excess of this are immediately excreted by the kidneys. In the doses mentioned in this paper there appears to be no danger of cumulative effect of magnesium if the dose is not repeated more frequently than once in twenty-four hours. The smaller dose referred to is calculated for an average infant of from one to four months and the latter for one from five to ten months. These are equivalent respectively to 0.6 gm. (10 grains) and 1.6 gm. (25 grains) of Epsom salts or one-half the amount of anhydrous magnesium sulphate. Marked physiologic symptoms are usually produced with this dosage and in many cases smaller doses will suffice.

The Oculo-cardiac Reflex.—E. B. Gunson (*Brit. Jour. Child. Dis.*, 1915, xii, 97) says that the oculo-cardiac reflex is a reflex change in the rate of the heart, associated in some cases with a change in rhythm, following ocular compression. The path of the reflex is considered to be along the fifth cranial nerve, the medulla, and the vagus or sympathetic. The reflex affords a simple means, under certain conditions, of acting upon the nervous mechanism of the heart in such a way as to produce all the changes in rate, rhythm, and conduction which follow vagus pressure in the neck. Under other conditions results analogous to those induced by stimulation of the sympathetic are obtained. The reflex is positive when slowing of the pulse occurs and negative when either no slowing or actual quickening results. Persons exhibiting the former state are described as vagotonics, those exhibiting the latter as sympathicotonics. The reflex is positive in normal persons. The reflex is positive in about 92 per cent. of children convalescent from diphtheria and scarlet fever. In about 8 per cent. the reflex is negative; these children are of a naturally nervous disposition. In some of the patients the reflex was negative during pyrexia. In cases of so-called "cardiac paralysis" the reflex was negative and remained

so till death, in fatal cases. In cases which recovered the reflex became positive when the heart returned to the normal state. In cases of diphtheria and scarlet fever in which the reflex was positive the following results were obtained: (a) Slowing of the whole pulse, with stoppage of the heart in some cases for as long as four seconds. (b) Production of premature contractions in cases in which they were previously absent and an increase in the incidence of the premature contractions when they were previously present. (c) Reduction of the $a-c$ interval. (d) Production of $c + a$ beats, due in some cases possibly to escape of the ventricle, in other cases presumably to the inception of atrio-ventricular rhythm. (e) (In diphtheria patients only.) Complete dissociation of auricles and ventricles. The claim that the oculo-cardiac reflex is of diagnostic value in differentiating cardiac failure due to myocardial lesions from that due to nervous lesions presumes the independence of the muscular and nervous functions of the heart and cannot be upheld. The oculo-cardiac reflex is of slight diagnostic value in confirming the nervous origin of the great majority of post febrile bradycardiacs and in differentiating them from cases of auriculo-ventricular heart block. As sinus arrhythmia, however, is present in nearly all cases of bradycardia due to the former cause, such confirmation is rarely necessary.

Tuberculosis as a Disease of the New-born.—The case reported by C. G. Grulee and F. Harms (*Amer. Jour. Dis. Child.*, 1915, ix, 322) was born of a mother with supposedly a healed tuberculosis, whose only subjective symptom was a severe leukorrhea of unknown cause. The baby born apparently at term and apparently healthy, had as early as fifteen hours after birth a high temperature, which continued irregularly until death. There was a distinct tendency to regurgitation, and on the seventh day generalized convulsions developed, which continued up to twenty-four hours before death. Death occurred on the eleventh day. On physical examination the child showed only an enlarged liver and enlarged spleen. At necropsy a generalized tuberculosis affecting most markedly the abdominal organs, and especially the periportal lymph glands, liver and spleen was found. The tuberculosis was miliary in type, but the stage of the tubercles suggests that it had already begun *in utero*. Many tubercle bacilli were found in all sections of tuberculous areas. From the meager data of the few reported cases it is impossible to draw definite conclusions as to the symptomatology of tuberculosis in the new-born. Enlargement of the liver is a suggestive symptom, especially when combined with an irregular temperature existing from birth on. The combination of enlargement of the spleen, high, irregular temperature and enlargement of the liver, together with tuberculosis in the mother, is suggestive. In all cases except the one here reported and that of Möller the tuberculosis in the mother was as severe as that of the child, the date of death of the parent being only a few days before or after that of the child.

Blood Transfusion in Infants and Young Children.—L. B. Robertson and A. Brown (*Can. Med. Assoc. Jour.*, 1915, v, 298) say that

transfusion is a safe and not complicated procedure. The danger from hemolysis is overrated and the injection of small air bubbles in experience has created no ill effects. In all cases the immediate effect is beneficial. The ultimate outcome depends on the original condition. The best results in our experience have been obtained in hemorrhagic disease of the new-born, simple secondary anemia, and marasmus. Transfusion is less clearly indicated in the secondary anemias which are not due to the loss of red corpuscles from the body, as in leukemia. In purpuric conditions of obscure etiology, transfusion is not indicated by the results which have been secured up to the present time. In many acute infections, general tuberculosis and malignant disease, the negative results are sufficiently definite to show transfusion to be of only temporary benefit. As compared with the method of direct transfusion, the syringe-cannula method is very much simpler, a much greater degree of control is obtained and the exact amount of blood is known. In comparison with those methods in which large receptacles are used for the transference of blood it has the advantage that the blood may be introduced slowly, intermittently, and in very small quantities, while in the large receptacles the apparatus is less easily manipulated, and if clotting occurs a great part of the blood may be lost. In very young infants its ease of application should recommend it as the method of choice.

Rupture of the Heart in a Child.—J. Anderson (*Lancet*, Mar. 27, 1915) records a case of spontaneous rupture of the heart in a girl five years of age. The interpretation which was placed on the case was that the child was the subject of an abnormal development of the coronary arteries. The vessels were unusually narrow and the lumen was encroached upon in places by the areas of thickening in the inner coat due evidently to a syphilitic endarteritis. A hematoma in the septum was more than likely the result of thrombosis in the descending branch of the left coronary artery, and represented really a dissecting aneurysm of the heart wall. Evidences of syphilis were seen in the other organs as well as in the heart itself. Spirochetes were demonstrated in the heart muscle.

Tuberculous Hip Disease.—P. W. Nathan (*Jour. A. M. A.*, 1915, lxiv, 1732) bases his remarks upon a study of about 200 cases in which particular attention was given to results after such an individual had used his affected hip during adult life. Tuberculosis of the hip is a destructive disease, which practically always leads to marked impairment of the joint structures. So far as we know, there is no treatment which will prevent or limit the destructive process and we have not, therefore, a method which will prevent permanent impairment of joint function. Such being the case, we have no adequate treatment for hip disease. For the present, we must be content to choose the method which will give the patient the strongest limb to stand and walk on, irrespective of joint motion or shortening. At present the treatment with the short plaster-of-Paris spica, with all its shortcomings, is better than any other heretofore in use, provided it is scientifically carried out.

177

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ORIGINAL COMMUNICATIONS.

**THE REAPPEARANCE OF MENSTRUATION AFTER
CHILDBIRTH.**

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It is the purpose of this paper to discuss critically the newer theories of lactation amenorrhea in the light of exact clinical observation. The paper, therefore, has been divided into three parts: the first, giving mere statistics of personal experience for comparison with similar statistics found in literature; the second part offering a brief outline of the various theories, either accepted or under discussion, concerning the cessation of menstruation during lactation; the third and last part, containing special statistical tables prepared to demonstrate the evident harmony or discrepancy between such theories and actual facts.

For many years the writer has entered on the records of private patients notes concerning the first appearance of the menstrual flow after childbirth. The histories of 209 patients detailing 309 births, in some instances covering from three to five confinements and lactations in the same patient, were found available for this study. It must be obvious from the character of the various statistical tables given in this paper that not all of the cases could be used in every one of the tables. This fact is pointed out here to explain the seeming discrepancy in the number of cases cited in the various tables.

While the actual number of my cases would seem small in comparison with some of the statistics of other authors, their particular value will become apparent from the fact that the data are exact, extend

through many years in the same case, and usually include information concerning menstrual type, parity, duration of pregnancy, character of labor, general condition of patient especially immediately after delivery, size of child, character of lactation, gynecological findings, etc. These are factors not considered in statistics heretofore published but play a very important rôle in the acceptable theories of lactation amenorrhea.

I. STATISTICS.

TABLE A.

Indicating appearance of first menstruation and duration of lactation in 257 cases (excluding all stillbirths and early death of child, the cases in which child never was put to breast and the cases of impregnation during lactation amenorrhea).

First menstruation appeared postpartum		Child weaned, months													
		Within													
	Total number of cases	3	4	5	6	7	8	9	10	11	12	13	14	later	
		58	18	8	24	15	10	36	14	23	22	4	9	16	
Within 12 weeks	132	47	13	6	14	5	2	16	4	10	5	1	2	7	
Months															
4	21	8	1		2	5	2	1	1	1					
5	27	3	3		5	2	2	1	2	3	5			1	
6	14		1	1	1	1	2	1		2	3	2			
7	12				1		2	4		3		1		1	
8	11				1	1	2		2						
9	7								2	2	1				
10	8							4		1	1	1	1		
11	6								2		3			1	
12	5							1	1	1		1	1		
13	4										3			1	
14	3							1							2
later	7										1		1		5

TABLE B.

Indicating appearance of first menstruation and duration of lactation in the 130 primiparæ included in Table A.

First menstruation appeared postpartum		Child weaned, months													
		Within													
		3	4	5	6	7	8	9	10	11	12	13	14	later	
	Total number of cases	24	9	3	12	8	4	15	8	15	14	2	5	10	
Within 12 weeks	68	19	8	2	9	3	1	7	2	6	4		1	6	
Months															
4	8	3			1	1		1	1	1					
5	15	2	1		1	2	1	1		1	5			1	
6	9				1	1	1			2	2		2		
7	6						1	1		2		1		1	
8	7			1		1		3	2						
9	4							1	1	1	1				
10	3							1		1		1			
11	5								2		2		1		
12	2									1			1		
13															
14															
later	3												1	2	

TABLE C.

Analysis of the fifty-eight cases (Table A) in which lactation ended within the first three months.

As "menstruating during lactation" are counted all women in whom menstruation appeared within the first six weeks after delivery or less than three weeks after weaning. As amenorrheic are counted the women in whom menstruation appeared later than three weeks after weaning.

58 cases:

menstruating, 38;

amenorrheic, 20.

TABLE D.

Similar analysis of the twenty-four primiparæ (Table B), in whom lactation ended within the first three months.

24 cases:

menstruating, 14;

amenorrheic, 10.

TABLE E.

The appearance of first menstruation before or after end of lactation in 199 cases in which child was suckled at least four months.

Weaned, months	No. of cases	Menstruating	Amenorrhoeic
4	18	14	4
5	8	6	2
6	24	22	2
7	15	13	2
8	10	10	0
9	36	30 (83.3%)	6 (16.6%)
10	14	11	3
11	23	22	1
12	22	18	4
13	4	4	0
14	9	8	1
later	16	13	3
	199	171 (85.9%)	28 (14.1%)
Weaned before four months (Table C).	58	38 (65.5%)	20 (34.5%)
Total.....	257	209 (81.3%)	48 (18.7%)

TABLE F.

The appearance of first menstruation before or after end of lactation in 106 primiparæ (Table B) who nursed child at least four months.

Weaned, months	No. of cases	Menstruating	Amenorrhoeic
4	9	8	1
5	3	2	1
6	12	12	0
7	8	7	1
8	4	4	0
9	15	14 (93.3%)	1 (6.7%)
10	9	6	3
11	14	14	0
12	14	14	0
13	2	2	0
14	6	5	1
later	10	8	2
	106	96 (90.5%)	10 (9.5%)
Weaned before four months (Table D).	24	14 (58.3%)	10 (41.7%)
Total.....	130	110 (84.6%)	20 (15.4%)

EXPLANATION OF TABLES.

Table A.—In establishing the exact relation existing between lactation and the first menstruation after childbirth the following cases had to be excluded: the cases of stillbirth or early death of the new-born, the cases in which for various reasons the child never was put to the mother's breast and obviously also the four instances of impregnation during lactation amenorrhea.

Table C divides the fifty-eight cases of short lactation into those which must be considered as menstruating during lactation, and those which can be classed as amenorrheic.

Since after stillbirth and in absence of lactation (as a rule also after abortions) first menstruation with comparatively few exceptions appears within four to six weeks postpartum, it seemed proper to include all cases of menstruation within six weeks, recorded in actually lactating mothers, into the group of "Menstruation during Lactation;" because in these cases surely lactation in no way had delayed the appearance of the first menstrual flow. Of those cases in which both lactation and amenorrhea ended within the first twelve weeks, as menstruating during lactation were counted only: (1) Those who actually had menstruated before the child had been taken off the breast; (2) those in which the milk disappeared with the appearance of first menstruation (a not uncommon observation); and (3) finally the cases in which the flow appeared within three weeks after ending of lactation.

There may be some difference of opinion concerning some of the cases (they are but few and not enough to influence the percentage figures) of the last group. Generally the first menstruation does not appear until four to eight weeks after ending of lactation. Therefore, it seemed justifiable to assume that the appearance of menstruation earlier than four weeks would indicate that not the cessation of lactation but some other cause has led to the reestablishment of menstrual function.

It may be stated here that in the same manner in Tables E and F the group "menstruating during lactation" includes the cases of simultaneous occurrence of weaning and first menstruation and also the few instances in which exact dates showed that menstruation had appeared within less than twenty-one days after the child had been weaned.

The justification for such a practice will be corroborated later in this paper when the present theories of amenorrhea during lactation are discussed.

Since various statistics found in literature point out certain differences existing between primiparæ and multiparæ, the special Tables B, D, and F have been prepared considering only the 130 primiparous women included in the 257 cases of Table A.

As "menstruating" were considered only the patients in whom a flow recurred with approximate or exact regularity. Included, however, were twenty-two cases of impregnation after only one menstruation and two cases of long lactation in which a typical menstrual flow appeared six weeks postpartum, the next flow, followed by others in regular interval, occurring several months later but still during the lactation period. Excluded were all cases of slight bloody discharge appearing a few weeks after birth but followed by a long amenorrhea.

CONCLUSIONS.

According to Table A in a total of 257 lactating women first menstruation reappeared in 132 instances (51.3 per cent.) within twelve weeks postpartum. This percentage of early menstruation among primiparous women according to Table B amounts to 52.3 per cent.

It is shown in Table E that among 257 lactating women, in 209 (81.3 per cent.) menstruation appeared before the child had been weaned, *i.e.*, that only forty-eight nursing mothers (18.7 per cent.) actually remained amenorrheic during the entire period of lactation.

Excluding from this number, the fifty-eight cases in which nursing had been stopped within three months, so as to eliminate all the cases in which the lactation process had not been fully established, there remain 199 patients who have actually nursed a child at least four months. They represent 171 cases (85.9 per cent.) of menstruation during lactation and twenty-eight cases (14.1 per cent.) of complete amenorrhea.

If we take the thirty-six cases in which the child had been weaned at nine months (in our series representing the month in which the largest number of cases weaned), we find strikingly similar conditions: 83.3 per cent. as menstruating before weaning, 16.6 per cent. as remaining amenorrheic during the entire duration of lactation.

Considering this same question in relation to the primiparous women, we see in Table F that among them the percentage of the absolutely amenorrheic is still smaller, the percentage of the menstruating mothers amounting to 84.6 per cent. for all the cases, and to 90.5 per cent. for those who continued to nurse for more than three months.

Both Tables E and F prove that extreme conservatism has been used in determining, which of the cases of a lactation of less than four months should be counted as amenorrheic and which as menstruating. It can be seen that for this group alone the percentage of "menstruating during lactation" has been figured decidedly lower than for the remaining cases.

We, therefore, feel justified in concluding as follows:

1. *In over 50 per cent. of all lactating women menstruation reappears within twelve weeks after delivery.*
2. *In over 80 per cent. of all lactations first menstruation appears before the cessation of lactation.*
3. *In primiparous women the percentage of those who begin to menstruate before the child is weaned is still larger.*

COMPARISON WITH OTHER STATISTICS.

Figures concerning the early return of menstruation in lactating women are given only in the papers of Sundin and Essen-Moeller, the former finding 37 per cent. and the latter 38 per cent. of such women menstruating *within eight weeks* after childbirth. My own figure of 51.3 per cent. is probably entirely in accord with their findings, since for definite reasons I have classed as early menstruation the reappearance of flow *within the first twelve weeks*.

Czerny and Keller in their great work on "Infant Feeding" (*Des Kindes Ernaehrung*) write: "We will emphasize the fact, apparently not generally appreciated, that the reappearance of menstruation during lactation is the normal, and that persistent amenorrhea is rather the exception." This view has been expressed before especially by French writers, Tarnier-Chantreuil, Budin, etc. Most of the larger statistics published of late prove that in the majority of cases menstruation will appear before the child has been weaned. To quote but a few of them: Heil found in 200 women, representing 234 lactations, 62.5 per cent. of the cases menstruating during lactation; Ponsoye figured about 50 per cent. as menstruating; Sundin in 335 nursing women from 55 to 59 per cent.; Essen-Moeller, offering one of the most thorough studies of the problem, in 428 women approximately 59 per cent. Some authors calculated the percentage of the menstruating lactating women somewhat lower: Remfry approximately 43 per cent.; Brickner 43.3 per cent. in 442 nursing mothers; Glass 40 per cent. in 1200 cases.

The percentage figures of the persistently amenorrheic vary in a corresponding manner, running with most writers below 50 per cent.,

but more pronounced differences are found in these figures as some investigators class as amenorrheic only those patients who have been amenorrheic in all their lactations, others counting (as done in this paper) each lactation as a separate case. There also is a difference in figures in accord with a difference in the meaning of the term "amenorrheic during lactation." Heil incorrectly, in my belief, counts as amenorrheic all women who weaned their children before the end of six weeks. Essen-Moeller does not include among the menstruating women those who weaned their children immediately after the appearance of first menstruation—surely an incorrect procedure for statistics destined to determine the degree to which lactation inhibits menstrual function or ovulation.

Some authors pointed out definite differences between primiparous and multiparous women. Thus Heil concluded that the number of those menstruating before weaning is larger in primiparæ. A similar opinion was expressed by Ponsoye, also by Tarnier, quoted by Essen-Moeller, the latter author, however, finding his own statistics not exactly in accord with such views.

Comparing these figures with my own it becomes evident that in my series of 275 lactations a percentage of menstruation before weaning at 81.3 is considerably above the highest mentioned in literature (62.5 per cent. of Heil). Various valid explanations can be offered for this fact: (1) As stated above (Explanation of Tables) in my belief, logically a case must be counted as menstruating if the first menstruation appeared in less than three weeks after weaning, which rule has not been followed, *e.g.*, by Heil, or Essen-Moeller. The correctness of such a procedure will be further established in the last part of this paper. (2) A definite source of error in former statistics undeniably is inherent to the methods employed to obtain the necessary data for such studies. Brickner's method probably is the typical one: Among 3947 women coming to the gynecologic department of the dispensary of Mount Sinai Hospital 442 were found who at the time were nursing their children. Of them 191 had menstruated, therefore, the percentage of those menstruating during lactation is 43.3. It seems obvious that a considerable number of those still amenorrheic at the time of questioning at a later date began to menstruate while still nursing their children. The percentage of appearance of menstruation during lactation can be correctly calculated only on women who have actually weaned their babies, the exact date of first flow and time of cessation of lactation being known. With very few exceptions my 275 cases comply with such a demand. (3) It will be shown later that good general health apparently

predisposes a nursing woman to an earlier return of menstrual flow. The healthy type of the lactating woman naturally will be more prevalent among private patients than among those seen in a dispensary service. Statistics based entirely on this latter class of patients, therefore, unavoidably must give too low a percentage of menstruation before weaning.

It seems extremely probable that my own figure of approximately 80 per cent. of appearance of first menstruation (followed by the more or less regular continuation of the function) before the child is completely weaned, fairly well represents the actual conditions for American women of average health.

My own observations also support writers quoted above who claim that the percentage of those menstruating during lactation is larger among primiparous women.

II. THE THEORIES OF LACTATION AMENORRHEA.

The fact established in the foregoing pages, that in the overwhelming majority of instances, menstruation reappears before the child is weaned, must force a rectification of the statement still commonly met with, especially in text-books, that the nursing woman usually remains amenorrheic. It is certain that approximately one-half of all nursing women are amenorrheic for a short or longer period but that only in about 20 per cent. of them the function of menstruation is not resumed until the child actually has been weaned. The etiological relation of lactation to amenorrhea thus remains a fact which calls for an explanation. Such an explanation, however, to be acceptable would have to harmonize with the clinical experience that the menstruation inhibiting effect of lactation in some instances is entirely absent, usually only temporary and only in a comparatively small number of cases is persistent.

We owe our present knowledge concerning menstruation and amenorrhea chiefly to the researches of Ludwig Fraenkel. A most complete and authoritative exposition of his own views and of those expressed by other expert workers in this field, Fraenkel has quite recently presented in the third volume of the *Handbuch der Frauenheilkunde*, edited by Liepmann (Leipzig, 1914) in a most original and almost fascinating description of the function of the female reproductive organs in the light of modern internal secretion theories.

His views, in so far as they pertain to the subject matter of this paper may be summarized as follows:

Menstruation and ovulation functionally represent an inseparable

unit, therefore, amenorrhea is almost always only the expression of an absence of ovulation. Cessation of ovulation and with it amenorrhea we meet whenever ovulation cannot serve the purpose of reproduction, *i.e.*, when the genital organs are in the state of reproductive activity (pregnancy, lactation), or permanently or temporarily unfit for the purpose (lack of development, before puberty, after menopause; when general health is impaired by wasting diseases or debilitating affections). Such a debilitating influence is exerted by lactation which entails an important loss of body fluids. Persistent cessation of ovulation, *i.e.*, continued amenorrhea, as a rule, secondarily leads to an atrophic condition of the uterus as the result of lacking ovarian (corpus luteum) stimulation. This means that (quite contrary to common belief) uterine atrophy is not the actual cause but indeed only the effect of continued amenorrhea. Fraenkel vigorously polemizes against the general view that nipple irritation incident to nursing exerts a particularly favorable influence on the involution of the uterus after birth—"a view beneficial to the laity for its educational value in a breast-feeding campaign, but absolutely incorrect." The woman nursing successfully is more likely to show a normal uterine involution simply because, as a rule, she is a healthy woman in whom both the function of lactation and the process of involution is most likely to proceed normally. In Fraenkel's belief it has never been proven that the uterine contractions, undoubtedly produced by the suckling of a child, actually could produce the so-called lactation atrophy of the uterus. "Overstimulated organs hypertrophy but do not atrophy. Inactive organs atrophy." A physiologic temporary and pathologic permanent uterine atrophy with accompanying amenorrhea (as its cause and not result) can be observed after birth also in nonnursing women, and is often seen in debilitated and weakened women without any possible relation to childbirth. It is the expression of complete failure in ovarian and uterine function. "Ovarian function represents especially in its ovulation process one of the most sensitive reagents to all disturbances of the normal equilibrium in metabolism."

In the puerperium large numbers of uterine muscle fibers undergo fatty degeneration, are resorbed and replaced. This occurs in nursing as well as in nonnursing women. At first the process of degeneration and resorption prevails, restitution beginning only later, dependent apparently upon some specific stimulating factor which seems to stand in a direct relation to the general condition of the woman. Under normal conditions about four months after birth this process of restitution begins to exceed in effect the process of

degeneration and resorption, and about six to nine months after birth restitution is completely achieved. Therefore, the uterus is found smaller than normal at four months and will remain permanently smaller (atrophic) if restitution does not begin to surpass resorption. This stimulus for active restitution undoubtedly originates in the ovaries. They are found small and without any symptoms of functional activity in all cases of uterine atrophy. As soon as the equilibrium of metabolism, disturbed by the excessive loss of body fluids through lactation, is regained, the ovaries resume their function. Ovulation begins and menstruation reappears.

Further condensed the explanation for the relation of lactation to temporary amenorrhea as offered by Fraenkel is the following: Lactation exerts a debilitating effect which finds its expression in cessation of ovulation, *i.e.*, amenorrhea. When the debilitating effect ceases first menstruation appears, the ovaries have resumed their functional activity.

It cannot be said that Fraenkel's theories concerning the relation of ovulation to menstruation, or concerning corpus luteum function and other internal secretion problems, involved in the question discussed in this paper, to-day stand unchallenged. It would be impossible and would serve no practical purpose to give here even an outline of the various objections and plausible arguments advanced against some of Fraenkel's observations and deductions. A student of recent literature must be convinced that the problem of ovarian function and its intricate relation to the function of other endocrine glands is still far from its definite solution. On the other hand, he must feel that theories of menstruation, of amenorrhea or lactation amenorrhea, identical or very similar to those sketched above, in the last few years steadily have gained ground and, indeed, have been accepted by such well-known writers as John Willoughby Miller, Wehmer, Robert Meyer and many others. Identical thoughts find their expression, *e.g.*, in a statement of Taentzer, a Russian author, emphatically endorsed by Fellner, to the effect that the regeneration of the uterus after birth is dependent upon the demands made on the maternal organs. Its restitution to function will occur quicker after abortion than after a full-term labor, quicker in the absence of than during lactation. Therefore, amenorrhea represents an anatomic protection of the mother, and will continue or cease as she needs or does not need further protection.

In recent discussions of this problem occasionally allusions are found to the fact that certain clinical experiences seem to support such views, but, to my knowledge, so far no attempt has been made

to analyze statistically clinical observations for the purpose of ascertaining accurately in how far they actually support or contradict modern theories of lactation amenorrhea.

III. STATISTICS IN THEIR RELATION TO THEORIES OF LACTATION AMENORRHEA.

While in Table A as early menstruating all lactating women are counted in whom menstruation had reappeared within three months postpartum, it seemed desirable, for the purpose of a more exact analysis, to tabulate specially all the cases, nursing and nonnursing, in which the menstrual function was resumed within seventy-seven days after birth.

TABLE G.

Appearance of first menstruation within eleven weeks after labor near term, including stillbirths, etc. 139 cases.

	I. Menst. within 42 days postpartum. Total number, 76	I. Menst. between 42 and 77 days postpartum. Total number, 63
Child stillborn or died soon after birth...	14	8
Child not nursed.....	4	0
Nursing stopped after four weeks, plenty milk but not agreeing with child.....	2	0
Scanty milk supply, weaned within six weeks.....	17	9
Scanty milk supply, weaned not earlier than two weeks before first menstruation.....		12
Nursed from three to five months.....	10	29
Nursed six months and more (up to sixteen months).....	13	21

Of the 139 cases of Table G, thirty-five are not suitable for the discussion of the possible inhibitory effect of lactation on ovulation, viz., twenty-two stillbirths and early deaths, four not nursed, and nine cases in which nursing had been discontinued more than three weeks before first menstruation appeared.

The remaining 104 cases form the basis for Table H, the first of a number of tables prepared to study the one essential claim of all modern theories of amenorrhea, that the cessation of ovulation is the expression of the debilitating effect of lactation.

In Winkel's *Handbuch der Geburtshülfe*, Heape is quoted, who observed a *Macacus cynomolgus* menstruating regularly during lac-

tation and believes that the cessation and reappearance of menstruation is dependent upon the general condition of the mother. Wehmer states that very healthy and strong women are more likely to menstruate during lactation. Graefe discussing a paper read by Glass mentions the fact that more than twenty years ago a French author had emphasized that especially the robust woman begins to menstruate early, and, therefore, had concluded that the menstruating woman will make the more desirable wet-nurse. On the other hand, we find Veit stating in the discussion of this same paper that early menstruation probably only indicates gynecological anomalies. Another French writer, Ponsoye, considers as preferable for wet-nursing the multiparous woman who had previously remained amenorrheic during lactation, because amenorrhea is the expression of the physiological normal condition.

TABLE H.

Appearance of menstruation within eleven weeks in relation to the general condition of mother immediately after labor, 104 cases.

Condition unknown or not definitely classifiable, 24.

Condition known, 80.

Strong and healthy, 55 (68.7 per cent.).

Generally weak or temporarily weakened or exhausted, 25 (31.3 per cent.).

A relation of 2 to 1 probably would express only the natural proportion between the strong and weak women in general. If we, however, remember that the twenty-five weak patients include all those temporarily weakened by a troublesome pregnancy or a difficult labor, hemorrhage, infection, etc., and properly consider the fact that approximately one-half of my cases represent primigravidae in whom complications of pregnancy and labor are more frequent, then we seem justified in concluding that Table H indicates a definite preponderance of the healthy mothers among those menstruating early in lactation.

More convincing, however, are certain facts shown in the next table.

TABLE I.

First appearance of menstruation during all lactations in strong and weak type of women (independent from temporary condition immediately after labor). Fourteen patients of Table A who nursed three or more children.

Healthy and strong type. 9 patients representing 31 lactations.

Menstruation within 12 weeks, 19.

Menstruation later than 3 months, 12.

Weak and undeveloped type. 5 patients representing 18 lactations.

Menstruation within 12 weeks, 3.

Menstruation later than 3 months, 15.

All those patients were selected who had actually nursed at least three children and who represented definitely either the strong or weak type. Of necessity these restrictions limited the number, but the result of this analysis clearly confirms the contention that weak and undeveloped women are more likely to remain amenorrheic for a longer time. Again we must remember that the thirty-one labors of the nine healthy patients include nine first labors, some of them difficult and exhausting. This fact probably in some instances has delayed the appearance of first menstruation, and, therefore, in this table necessarily the prevalence of early menstruation among the healthy mothers is not as markedly pronounced as the late appearance in the weak patients.

The thought suggested itself that in a general way it could be assumed that the larger child, requiring more nourishment, during lactation would represent a more weakening factor than the smaller child, and this consideration lead to a compilation of 118 cases in which my records gave the weight at birth besides the other required information.

TABLE J.

The relation of appearance of first menstruation to the size of the child. 118 cases.

	I. Menstruation within 12 weeks	I. Menstruation later than 3 months
Weight below 6 lb., 14 cases.....	9 (64.3%)	5 (35.7%)
Weight between 6 and 8 lb., 65 cases.	34 (52.3%)	31 (47.7%)
Weight above 8 lb., 39 cases.....	16 (41%)	23 (59%)

To bring out clearly the possible difference in the effect of the large or small child on ovulation rather arbitrarily infants weighing between 6 and 8 pounds were regarded as of normal size.

Of these 118 cases, just fifty-nine, *i.e.*, 50 per cent. show a first menstruation within twelve weeks postpartum, which is in accord with the 51.3 per cent. of early menstruation of the total of 257 cases of Table A, or with the 52.3 per cent. for the thirty-four average-sized babies of this series. On the other hand, this Table J shows clearly that the large child apparently delays the appearance of first menstruation approximately to the same degree as the small child seems to hasten the resumption of this function. This evident effect of the large child to lengthen the period of amenorrhea, therefore, must be accepted as a further proof of Fraenkel's contention.

However, one argument could be raised against such a conclusion, viz., that the size of the child may exert an effect on the general ability of the mother to nurse, and that the difference in the appearance of first menstruation may be only the expression of a difference in lactation.

Such an argument is answered in the next table.

TABLE K.

The relation of duration of lactation to the size of the child. 118 cases of Table J.

	Lactation ended within 12 weeks	Lactation ended at 6 months or later
Weight below 6 lb.	4 (28.6%)	9 (64.3%)
Weight between 6 and 8 lb.	14 (21.5%)	38 (57.7%)
Weight above 8 lb.	10 (25.6%)	24 (61.5%)

In the remaining nineteen cases lactation ended in the fourth or fifth month.

Only those ninety-nine cases are considered which show either a decidedly unsatisfactory or a surely satisfactory lactation by eliminating the nineteen instances in which the child was weaned in the fourth or fifth month (to conform with the division in Table G).

It will be seen that there is practically no difference caused by the size of the child, the thirteen cases of undersized infants hardly permitting accurate figuring in per cents. on account of the small number.

If we further consider the fact that of the 257 cases of Table A, fifty-eight mothers (22.5 per cent.) weaned within twelve weeks and 173 (65.3 per cent.) nursed six months or more, the reliability of Table K and with it of Table J seems clearly established.

The large child undeniably retards the appearance of first menstruation solely through its direct influence on the general condition of the mother, an influence which must be regarded as debilitating in view of the larger demand for nourishment and of the probability of a more exhausting labor.

The evident relation of a weakening influence of labor to the reappearance of first menstruation also seems well illustrated in the following observations:

CASE LXIX.—Primipara. Very difficult and long labor in a case of locked premature twins. Both infants died within twenty-four hours. First menstruation eleven weeks postpartum.

CASE CCII.—Secundipara. Full-term labor. Placenta previa with excessive hemorrhage. Child stillborn. First menstruation ten weeks postpartum.

CASE CCXVI.—Primipara. Very difficult forceps. Child still-born. First menstruation ten weeks postpartum. For next six months interval between menstruations is six to seven weeks, used to be regular four weeks.

CASE CCXLII.—Secundipara. Full-term twins. Excessive hemorrhage. Within seven days both infants put on artificial food. First menstruation about four and one-half months postpartum. This patient nursed first child for nine months with first menstruation seven months postpartum.

CASE CCXLVII.—Primipara. Difficult forceps followed by infection, apparently parametritis. Nursed child eight weeks. Very little milk. First menstruation five months postpartum.

The conclusion, therefore, can be drawn that a statistical study of clinical observations shows *that the healthy and strong woman is likely to menstruate early, while the generally weak or only temporarily weakened woman, as a rule, remains amenorrheic longer and that lactation evidently forms one of the weakening influences, because in the woman who nurses a larger child the reappearance of menstruation is markedly delayed.*

It must, however, be admitted that there are probably other influences at work accelerating or retarding the appearance of menstruation after birth.

Brickner explains the early return as the expression of a "strong menstrual habit" partly due to heredity—he wrote his paper in 1899, that is, before internal secretion theories had brought much light and also some darkness into the problems of menstruation.

It has been suggested by Schlichte that early resumption of sexual relation will shorten the amenorrheic state. In Liepmann's *Handbuch der Frauenheilkunde* (p. 478) we find the statement that observations on animals and women of low civilization (*geistig minderwertig*) show that the first ovulation occurs when the child is weaned. In general the female animal during lactation will not admit the male, because, not ovulating, she does not get into heat. In the flat country more often than in the large city, women remain amenorrheic during lactation since, as a rule, the latter group is more exposed to sexual stimulation. My material does not permit an investigation of this particular question.

In a most indefinite manner occasionally writers have referred to the possibility of an etiological relation of gynecological anomalies to the early appearance of menstruation (*e.g.*, Veit in the discussion of Glass's paper as already mentioned). Exact data, to my knowledge, never have been published. Enough information was found available in the records of my patients to study this problem at least in relation to retroversion or retroflexion of the uterus.

From the 139 cases of Table G again the thirty-five cases were eliminated (see explanation of Table H) in which the return of menstruation was not influenced by lactation.

TABLE L.

First menstruation within eleven weeks in relation to position of uterus. (The 104 cases of Table H.)
Position not recorded, 28.
Position recorded, 76.
Position normal, 48.
Retrodeviation, 28 (36.8%).

This table shows the presence of a retroversion or retroflexion in 36.8 per cent. of women menstruating within seventy-seven days after birth, though they were actually nursing their children.

In the total number of 209 patients representing 309 labors, considered in this paper, there are forty-one women with sixty labors in whom the uterus had been found in an abnormal position, *i.e.*, while a retrodeviation actually existed in only 19.4 per cent. of the total number of labors, this anomaly is present in 36.8 per cent. of the women menstruating within eleven weeks.

But this apparent effect of retroversion still better can be shown in a special consideration of the sixty labors of those forty-one women exhibiting this gynecological anomaly.

TABLE M.

The appearance of menstruation in lactating women with retrodeviated uterus.
Total: 41 women giving births to 60 children, representing 57 lactations (one stillbirth, one not nursed, one not menstruating on account of new impregnation).
Menstruation within 12 weeks postpartum, 39 (68.4%).
Menstruation later than 3 months, 18 (31.6%).
Excluding 3 cases (lactations) in which malposition was discovered only after a subsequent birth:
Total 54.
Early menstruation, 38 (70.3%).
Late menstruation, 16 (29.7%).

The cases of retrodeviation thus show a percentage of 68.4 per cent. or possibly of 70.3 per cent. of early reappearance of menstruation, which in the cases with a uterus in normal position positively must be much lower, since we have found it 51.3 per cent. (Table A) for the 257 lactations which obviously include all the retroversions.

That a uterine malposition does not necessarily cause the early return of menstruation, however, can be seen from the fact that of twelve multiparous women with retroversion five in all lactations menstruated within three months, while five others in all lactations menstruated later than three months, and of the two remaining

women each menstruated late after the first labor (debilitating influence) but early after the second labor.

We, therefore, seem justified in concluding that *a retrodeviation of the uterus (retroversion or retroflexion) represents a factor of apparent importance in the early return of menstrual function.*

This observation seems important and also striking. If the first menstruation after labor actually indicates the restoration of the inhibited function of ovulation, then the result of this investigation would seem to prove a definite influence of an abnormal uterine position on ovulation. Such an influence, however, is not compatible with our present conception of ovarian function, and, therefore, requires further elucidation.

The view is rather generally accepted that there can be no menstruation without ovulation. But even if this represents an actual fact, it still would not be permissible to draw the inverse deduction that the absence of menstruation proves the absence of ovulation. This, however, practically is Fraenkel's assumption when he claims that the reappearance of menstruation is solely dependent upon maturation and rupture of the first Graafian follicle after labor. Implicitly such an assumption accepts as established facts, (1) the cessation of ovulation during pregnancy and (2) an inevitable response of the endometrium to corpus luteum stimulation in form of a menstrual flow.

While it seems extremely probable that Graafian follicles during pregnancy do not completely mature and actually rupture (Bucura, Robert Meyer, Miller, Leo Loeb, Seitz, etc.), some writers still advance valid reasons why such theories at present cannot be accepted as axioms (Fellner, Krönig, De Lee). In some form the endocrine function of the ovary positively continues as can be proven, e.g., by its specific stimulating effect on the mammary glands during pregnancy, or by the continuation of that symptom-complex generally called the menstrual wave (Fellner, Keller, etc.).

On the other hand, clinical observations strongly suggest that under certain conditions the anatomic state of the uterus itself (abnormal innervation, atrophy, etc.) may be responsible for the temporary cessation of the regular menstrual flow in spite of apparently normal ovarian function (Ehrenfest).

In this latter manner, in my opinion, can be interpreted some instances of my own series in which menstruation failed to reappear with the usual promptness although the patients at the time of weaning were in perfect health:

CASE LXXIV.—Primipara. Nursed nine months. First menstruation three months later.

CASE LXXV.—Secundipara. Nursed five and one-half months. First menstruation almost ten weeks later.

CASE CLXX.—Primipara. Nursed fourteen months. First menstruation three months later.

CASE CCLXXX.—Para-iv. Nursed twelve months. First menstruation four months later.

According to Fraenkel ovulation occurs when the debilitating effect of lactation ceases, the menstrual flow appearing from ten to twelve days (according to others, fourteen days) after the rupture of the Graafian follicle.

In a study of Fraenkel's theories in the light of clinical facts, as attempted in this paper, it, therefore, becomes not only permissible but indeed necessary to figure as ovulating (menstruating) during lactation every woman in whom menstruation had returned earlier than three weeks after weaning. A period of approximately only one week thus is allowed as necessary for the establishment of the equilibrium of body fluids presumably disturbed by lactation. Undoubtedly this equilibrium in the majority of women is reestablished before the cessation of lactation. This fact is expressed in the high percentage of those menstruating before weaning. Mothers who are able to continue lactation for twelve or more months generally represent the healthy and strong type. As a rule, they have actually improved physically during lactation. If in such women menstruation exceptionally does not return four or six weeks but ten to twelve weeks after weaning, this fact, in my belief, more plausibly than by a debilitated condition can be explained in the following manner: Probably exactly as suggested by Fraenkel the uterus has become atrophic not through long-continued nipple irritation but as the result of lacking ovarian stimulation. But under these circumstances one ovulation (the first corpus luteum stimulation) is not sufficient to restore the uterus anatomically to the extent of being able to respond in the usual way with a typical menstrual flow. In other words, this would mean that *if during lactation the uterus is atrophic ovulation may occur without menstruation*.

This conclusion also seems supported by a consideration of the not uncommon occurrence of impregnation during lactation amenorrhea.

Fraenkel found that of 109 women seventy-four had conceived while amenorrheic, and only thirty-five after one menstruation. On the fact, that only in one-half of them menstruation had returned, he bases the following theory: Simultaneously with the formation of the corpus luteum the endometrium histological palyssees into the

premenstrual stage of its regular cycle which is identical with its pregravid condition. If the liberated ovum is fertilized promptly, the endometrium has not time to go into the next—the menstrual stage of the cycle. The ovum becomes implanted and the menstrual flow fails to appear. It is the general belief among laity that amenorrhea during lactation protects against impregnation, and, therefore, the amenorrheic woman is more likely to indulge freely in sexual relation. Her chances to conceive thus are greater than those of the woman who is careful, because she is menstruating. The basis for his explanation he finds chiefly in his own figures which actually show the distinct prevalence of the amenorrheic over the menstruating women impregnated during lactation.

The observations of other authors tend to show that conditions probably are different. Heil found that a new gestation had started without a menstrual flow only in 29 per cent. of his cases while 71 per cent. had menstruated. According to the statistics of Remfry the chances of impregnation during lactation are just ten times greater for the menstruating than for the nonmenstruating woman (60 in 100 as against 6 in 100).

In my own series there were four cases of pregnancy during complete amenorrhea and twenty-two cases subsequent to one menstruation.

Such figures more than those offered by Fraenkel seem in harmony with the views generally held, *e.g.*, by the writers of text-books. If impregnation during amenorrhea is the comparatively rare exception, and not the rule as claimed by Fraenkel, it would seem impossible to accept his explanation of the failure of a menstruation to appear in spite of the undeniable fact that an ovulation had occurred.

Like impregnation before puberty, also impregnation during lactation amenorrhea seems more plausibly interpreted by the theory offered above, *viz.*, that under certain conditions the uterus is anatomically unable to react specifically in form of a menstrual flow to the stimulation of a freshly formed corpus luteum. It may be emphasized in this connection that such an assumption in no way precludes the possibility or even probability that with the formation of the corpus luteum the endometrium changes into the premenstrual stage of its cycle presumably essential for the nidation of the ovum.

The remarkable investigations of Hitschmann and Adler have forced a radical change in the old and time honored teachings concerning the relation of endometritis to menorrhagia and metrorrhagia. The formerly so important anatomic condition of the uterus has so

rapidly lost its dignity as an etiological factor in uterine hemorrhage that to-day Fraenkel and others proclaim an abnormal ovarian function as the sole direct cause of any abnormal bloody discharge from the endometrium, with the exception only of polyp, carcinoma and incomplete abortion. Such theories, however, are not positively proved and do not entirely harmonize with certain clinical facts. Hitschmann in a recent paper attempted to show that the menorrhagia so often seen in connection with a retroflexed uterus actually is not due to the malposition itself. His arguments are not convincing and do not coincide with the rather common observation of a spontaneous disappearance of the menstrual anomaly after a correction of the malposition. While the function of the ovary undeniably is the most essential factor in the causation of a hemorrhage from the endometrium we still seem justified in assuming that the uterus under certain conditions, at least occasionally, either fails to respond to specific ovarian stimulation or reacts unusually promptly and intensely. As such conditions we suggest an atrophy due to lactation or a hyperemia due to retrodeviation.

The following facts appear to be incontrovertible: The normal uterus approximately during the third or fourth month of lactation, as a rule, is found atrophic. The retroverted uterus involutes slower. More often than the normally lying uterus the retroverted uterus is found in a state of subinvolution.

Granted a certain, however small, influence of the anatomic condition of the uterus on the promptness and degree of specific ovarian stimulation, we can understand why the woman, whose uterus is lying in a retroversion or retroflexion, is likely to menstruate earlier as is so clearly shown in Tables L and M.

We, therefore, conclude: *The fact that a uterine retrodeviation tends to hasten the return of menstruation does not contradict Fraenkel's general theories of lactation amenorrhea.*

This fact, however, as pointed out in the foregoing furnishes a valuable argument against the contention that the first menstruation after labor necessarily indicates the first ovulation.

Summing up the results of this statistical study of the problem of lactation amenorrhea it seems that clinical experience evidently sustains the following views:

A debilitating influence exerted immediately by labor and later by the loss of body fluids during lactation with rare exceptions temporarily arrests ovulation. As soon as the disturbed equilibrium is restored the ovary resumes its function of ovulation, and the first corpus luteum

sends its specific hormon to the endometrium. The response of the latter probably to a certain extent is dependent upon the anatomic condition of the uterus. If normal, a typical menstrual flow ensues; if subinvoluted or for other reasons hyperemic (retroflexed), the reaction may be unusually strong; on the other hand, if the uterus is in an atrophic condition, it may require the stimulations from more than one ovulation until it becomes anatomically restored to the degree of resuming its function. As a rule, menstruation continues practically regularly during lactation when once reestablished. The debilitating effect of lactation is obviously dependent upon the general condition of the woman. Therefore, usually the disturbance in the equilibrium of body fluids ends sooner and menstruation reappears earlier in the strong and healthy woman. For the same reason the amenorrheic state in general will last longer in the sick or weak woman, in the primi-gravida, whose labor as a rule is longer and more exhausting, and in the woman suckling a large child. But in the majority of women the equilibrium is regained before they have actually ceased to nurse their children, and, therefore, in the majority of instances menstruation reappears before the function of lactation is ended.

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METROPOLITAN BUILDING.

SERUM-SKIN TEST FOR PREGNANCY AND DIFFERENT PATHOLOGICAL CONDITIONS.

BY

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SINCE the introduction of the Abderhalden test for serum diagnosis of pregnancy much work has been done all over the world with the view of establishing the limitations of the specificity of this method. As long as the work was done by the author himself or under his personal supervision, the results obtained seemed to indicate that the reaction might be of practical value. As soon, however, as the work extended to other laboratories it was found that the results of the tests disagreed greatly in the hands of different investigators. It was evident that the technic of the test as originally described by its author did not guard sufficiently against possible complications.

In a recent communication(1) we called attention to two very important sources of error which may explain certain contradictions in the results obtained by different workers using the Abderhalden method. We showed that control of the amount of substratum used in the test is most important, since excess of substratum may cause a nonspecific autodigestion of the serum. We also showed that by performing the test in two phases, one can most efficiently counteract the complications arising in cases where the serum may contain free dialysable substances. There are, however, other elements in the test which may lead to errors in the result.

It is not necessary to enter into detailed consideration of all of them, since the majority of difficulties have been successfully removed by the improvements of the test introduced by Abderhalden himself as well as by a number of his pupils. This refers for instance to the question of collection of blood, free from hemoglobin. According to Bronstein(2) this is accomplished by the use of paraffined

centrifuge tubes.* Another question which was very widely discussed is that of preparation of suitable substratum. This question is no longer considered of great moment since the technic of preparing placenta protein as described by Schwarz(5), for instance, gives invariably good results(6). A possibility of nonspecific summation reaction can be excluded by using controls as described by Frank, Rosenthal and Biberstein(7), etc.† There are, however, many important weaknesses in the technic of the test which thus far have not been satisfactorily solved.

Many authors for instance called the attention of the workers to the fact that it is most important to control the permeability of the thimbles(8). They have stated that even if the thimbles are once proven to be suitable, they do not remain so long. Repeated boiling may render them impermeable for peptone and on the other hand, the slightest, often invisible, mechanical injury to the wall of a thimble in manipulations preparatory to the test renders such a thimble permeable for the unchanged serum. Still another complication was found by the workers in the fact that the ninhydrin reaction as such is very delicate(9), and not only such factors as the alkalinity of the glassware(10), but even the length and intensity of boiling(11) the ninhydrin solution with the dialysate greatly influence the final reading. As a result of these findings numerous attempts were made by different workers to obviate the use of both thimbles and ninhydrin in the test. It is thus that Michaelis(12) suggested his iron method, recently improved by Van Slyke(13), and Matzkievitch(14) the colloidal gold method, in order to determine the degree of digestion during reaction. Other workers resorted to the use of the Kjeldahl(15) or Van Slyke(16) amino-nitrogen determination method for the same purpose.

In our earlier publication we have shown that the combination of the immune serum with its corresponding substratum is followed by the autodigestion of the serum(17). We have observed that the split products of such autodigestion of serum are toxic and probably identical with so-called anaphylatoxin(18). On the basis of our early observations in this direction we have suggested a method of diagnosis in which this formation of toxic substances as a result of a specific process of interaction between antibody and antigen was made use of(19).

The results with the serum skin test (as we called this reaction)

* According to some authors(3) this precaution was not at all necessary. In our experiments we found(4) that sera reacted exactly in the same manner whether they were very rich in hemoglobin or absolutely free from it.

† For further discussion of similar questions we would refer to our previous publications in the *Journal of Experimental Medicine*.

although quite uniform when applied to the diagnosis of experimental tuberculosis in guinea-pigs, were not quite as satisfactory when applied in the cases of human tuberculosis(20). The further study revealed the cause of this irregularity and the technic of the method was changed accordingly(21-22). We found that the split products of the serum undergoing autodigestion, were uniformly toxic only for the animals of the species from which the serum derived. Thus, as we have shown elsewhere(21), the products of autodigestion of human serum are toxic for human beings but not for guinea-pigs. Moreover we have shown that human serum, naturally toxic for guinea-pigs, loses its toxicity as its autodigestion proceeds(21).

In the serum skin test, as we originally described it(19), the appearance of split products depended on autodigestion of human serum and therefore the toxicity of the resulting material was not uniform as tested on guinea-pigs.*

In its present modified form(22) the serum-skin test is performed so as to test the split products of the autodigested serum upon homologous animals, namely,

The serum of the patient is injected intraperitoneally into a normal guinea-pig thus transferring to the guinea-pig the specific properties of the patients serum. Twenty-four hours later this guinea-pig is bled, its serum is placed upon ice in a test-tube with a suitable amount of substratum (placenta, tuberculin, B. E., tumor tissue, etc., as the case may be). Next day (twelve to eighteen hours later) the serum is centrifuged off and placed in the incubator for from twelve to eighteen hours. During this incubation the serum undergoes autodigestion and toxic split products of the serum are formed, as we have shown before(21).

At this time 0.05 c.c. of such autodigested guinea-pig serum is injected into the skin of a normal guinea-pig on a spot previously shaven. From twelve to twenty-four hours later one observes a very distinct skin reaction on the place of the injection if the serum of the patient used in the test contained specific antibodies. Instead of injecting the autodigested serum into the skin one can inject 0.5 c.c. of this serum into the heart or in the vein of a normal guinea-pig in which case the guinea-pig will die with symptoms of acute anaphylactic shock if the serum was specific.†

* Considering this point it is surprising to find that Kolmer and Williams who have recently repeated our work with our old nonperfected method report good results.(23)

† If the serum of the patient did not contain specific antibodies, the serum of a guinea-pig (which received such a normal human serum intraperitoneally) may be injected into the veins of normal guinea-pigs in the quantity of 5 c.c. and more, without causing any symptoms.

Although by this method one avoids the complications incumbent upon the possible presence of dialysable substances in the serum of the patient as well as the possible errors connected with the use of thimbles and ninhydrin, it is necessary to remember that this test depends on the autodigestion of the serum in the same degree as the original Abderhalden test. As in the Abderhalden test, in the serum-skin reaction the autodigestion of the serum may take place as a result of specific as well as nonspecific action of substratum upon serum. The test may be reliable therefore only if the quantity of substratum used is such that it is unable to cause autodigestion of the serum by merely mechanical adsorption.

The modification we offer, therefore, does not improve the specificity or the sensitiveness of the Abderhalden reaction since it depends upon the same mechanism, but by this method we avoid the additional difficulties and discrepancies in results due to the complications in the reading of the results of the reaction by the original method of Abderhalden.

CONCLUSIONS.

1. The use of thimbles and ninhydrin offer a source of errors in reading the results of the Abderhalden reaction.
2. Many workers have tried to modify the Abderhalden reaction so as to avoid the use of either thimbles or ninhydrin.
3. Our modification allows one to dispense with thimbles and ninhydrin by taking advantage of the formation of anaphylotoxin resulting from the combination of specific serum with its corresponding substratum during incubation.

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TWO CASES OF SO-CALLED "MISSED LABOR" WITH DISCUSSION.

BY

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It has been my fortune to have met recently a second case of that rarest of obstetrical freaks, "Missed Labor." The first happened a good many years ago, in my earlier practice, and, with all the advances in Obstetrical Science and Art from that day to the present, the condition is about as much a curiosity now as it was then. The clinical history of these two cases naturally precedes their discussion, and is given as briefly as possible for their intelligent study.

CASE I.—The patient was English by birth, about thirty years old, a housewife, who had borne one living child thirteen years before, and been sterile since then to the present. The last menstruation was in January, 1884. She thought she had miscarried during the next May, for which some intrauterine operation was done, that was followed by peritonitis and six weeks' illness. In July I found her still pregnant, with distinct fetal movements and heart sounds.

Labor began during the evening of October 29, the day of computed term. The child's position was directly transverse, head to right, fetal heart 150 to the minute, the cervix very high, un-effaced and undilated, and cartilaginous to the touch. All contractions ended after eighteen hours. Labor began again, November 28, thirty-one days after the first attempt at labor, but stopped after a few hours as before. During the first week of

December she was evidently growing septic; there were chills, increased temperature, etc. Fetal movements and heart sounds were lost about the middle of the month, but there was still no labor. All consultants advised temporizing. Attempts at dilating the cervix failed because of its rigidity; the finger could be passed through a long canal, as inflexible as bone, and within the uterine cavity could be touched some part of the child. December 17 the waters discharged with some "pieces of flesh." Vomiting, rise in pulse and temperature with prostration increased, until finally on December 29, almost exactly two months from the first attempt at labor, it was decided to deliver. The cervix was divulsed by the consultant with some instrument, followed by immediate collapse and flooding. Almost the whole of the cervix had been torn off from the uterine body. By the advice of other consultants laparotomy was made as soon as she could be revived to some extent.

I quote the following from my notes of the operation: "The catheter showed the bladder empty. Abdomen opened in midline from 2 inches above navel to pubes. No vessels ligated. Peritoneum firmly adherent over uterus, and freed 4 inches by finger. Uterine wall $\frac{1}{2}$ inch thick, fatty changes in muscle excessive. No hemorrhage. Uterine cavity full of thick fluid, not offensive. Child presented by back, delivered by traction on arm and hips. It was a female, much softened, skin livid and peeling, and weighed 8 pounds. Uterus did not contract after delivery. It had been incised through the placenta, which was strongly adherent, and looked like a dirty, worn-out sponge. Cavity of abdomen cleansed as well as possible with sponge. Uterus quite friable, and closed with continuous catgut suture, the abdomen with silk. The uterine tear was evident, and through it a sponge was passed into the peritoneal cavity. External wound dressed with cotton and bandaged." In spite of vigorous stimulation the patient never rallied, as might have been expected, and died suddenly twentyeight hours after operation.

This was the third Cesarean section in the State of Maine, and the clinical story is doubtless interesting to the antiquarian in obstetric surgery.

In connection with this history I cannot deny myself the privilege of reminiscing by adding two personal letters, received in reply to the report of the case. The first is from Dr. William T. Lusk, of New York, at that time one of the foremost obstetricians of America. No words of eulogy that I can write can heighten his reputation among his contemporaries as a friend and savant. He was borne in 1838, studied in Heidelberg and Berlin, received the doctorate from Bellevue, was Professor of Physiology at Harvard Medical School in 1870, then Professor of Obstetrics at Bellevue and Obstetrician to that and other hospitals, and was long one of the editors of the New York Medical Journal. He was the author of

"The Science and Art of Obstetrics," that had many editions and was translated into several foreign languages. He was an enormous writer and went abroad every year, where he presented papers before British and Continental Societies. He died suddenly at the height of his fame in 1897.

His letter is as follows:

Jan. 18 (1885), 47 E. thirty-fourth St.

"Many thanks for your report which I shall take occasion with your permission to refer to in my forthcoming new edition. (Lusk's "Midwifery," ed., 1894, p. 305.) It is of special interest because of Müller's thesis (*De la grossesse utérine prolongée indéfiniment*, Paris, 1878), in which he maintains that all such cases are really cases of extrauterine gestation. Barnes, however (*Obst. Trans.*, vol. xxiii, p. 81), reports a case which hardly admits of doubt and yours settles the question. Kuchenmeister (*Arch. für Gynaec.*, vol. xvii, p. 183), refers retention to hardening of the cervix, to carcinoma, fibroids, and pregnancy in a rudimentary cornu. I should think in your case the loss of uterine contractility was secondary to peritoneal adhesions. The presentation probably contributed to the result."

(Signed) "W. T. LUSK."

My second letter was from Dr. Robert P. Harris of Philadelphia, and a few words *in memoriam* of him may not be out of place in this connection. He was born in 1822, and died in 1899; received the doctorate from the University of Pennsylvania in 1843, studied in New York and Paris, and spent his life in Philadelphia in active practice for over thirty-five years. He was extremely interested in surgery and gynecology, and became one of the foremost medical statisticians of the United States, particularly on Cesarean sections, and especially on cases resulting in the delivery of living children through lacerations of the abdominal walls by the horns of cattle. For many years he was an editorial writer for the *Philadelphia Medical News*, he also edited the American edition of Playfair's "Midwifery," and was a recognized expert in his speciality.

His letter reads as follows:

"Jan. 15, 1885, 329 S. twelfth St., Philadelphia.

You are one of five unfortunate Cesareanists of 1884, all of whom lost the woman and child. There is no case like yours in the English records. The case was one of metroperitonitis with consolidation and infiltration of uterine tissue, and possibly fatty degeneration of its muscular fiber. In two cases in this country, both blacks, calcareous deposits aided to occlude the os uteri and prevent its dilatation, and in another the cervicitis had caused an entire obliteration of the os. In Europe such cases have been generally treated by hysterotomy and the cervix thus opened. I refer you to the following cases:

1. Richmond's case. *West. Jour. Med. and Phy. Sci.* 1880, vol. iii, p. 485.
2. Travis case. *West. Med. Jour.*, 1842, p. 352.
3. Charlatan's case. *Am. Jour. Med. Sci.*, vol. xviii, p. 257.
4. Herndon's case (nearest to your own). *Op. Cit.*, vol. xii, n. s., p. 386.
5. Gorham's case. *N. O. Med. and Surg. Jour.*, vol. vii, 1852, p. 194.
6. Egan's case. *N. O. Med. and Surg. Jour.*, July, 1877, p. 35.
7. Brickells' case. *N. O. Med. and Surg. Jour.*, vol. xxi, 1868, p. 454.

Your case is No. 132."

(Signed) "ROBERT P. HARRIS."

I have introduced this bit of biography to recall to the younger generation two of the men, who helped in the Renaissance of Obstetrics. I well remember the thrill of pleasure I felt, when the letters were received, that two such men should have thought the case important enough to notice it so kindly.

My second case of "missed labor" is quite recent, and a short account of it is as follows:

CASE II.—The patient is an American, twenty-eight years old, a fine looking, healthy young woman, weighing 168 pounds. Except an attack of pneumonia when four years old, she has never been sick a day in her life, up to the present illness. Menstruation has always been normal and painless, she has been married four years and this is her first pregnancy. The first day of the last menstruation came on June 23, 1914, and when she found she was with child, "she rejoiced and was exceedingly glad." During the entire nine months she was absolutely well; there was no nausea, no kidney disturbance, her housework was done easily except as she felt the increasing burden of the child. Labor was expected March 30, but did not take place. As days went by her discomfort grew more and more from the motion and weight of the child, until work and exercise had to be given up. Meantime there was no labor nor symptom of it. Saturday evening, May 1, the waters came away painlessly but her physician found no dilatation of the cervix. During the next three days the cervix remained unchanged, the uterine discharge became fetid and mixed with meconium, but there was still no labor. Wednesday noon, four days after discharge of the waters and thirty-six days after computed term, I was called in consultation. Examination showed a tense, nulliparous vagina, the cervix effaced, the os dilated enough to admit the tips of two fingers, and high up, but not engaged, some unrecognized part of the fetus. The girth of the abdomen was 47 inches, the length of the uterine tumor 16 to 17 inches, and no fetal motion nor heart sounds could be detected. Palpation for the position was not positive, but considered together with the premature escape of the

waters, and the height and lack of engagement, it seemed reasonable to believe that the position was irregular and probably a breech.

The *status praesens* was, then, a primipara, thirty-six days beyond term, a massive dead child in abnormal position, a dry uterus, a tense, close vagina, beginning infection (temp. 99.5°) and no effective labor. It was apparent she ought to be delivered without further waiting, and the only question was the method.

The risks to the mother from a clean Cesarean seemed to me much less than from a difficult and risky podalic version, the latter rising to the magnitude of a major operation under the conditions of a dry uterus, a massive child, and the probabilities of severe lacerations and infection. The mother's interests were paramount to those of the child, which was already dead. The unfortunate results in two breech deliveries *per vaginam*, within a few days, undoubtedly influenced that decision. The operation was accepted and she was admitted to my service in the Maine General Hospital that afternoon.

The uterus was opened through the high abdominal incision. The child lay, as was expected, in the right sacral position, and was quickly extracted by the feet. It weighed 11¼ pounds, and had been dead long enough for the skin to peel. There was very little hemorrhage from the uterine incision nor after removal of the immense placenta. The uterus was evidently involuting, and did not begin to contract until after the application of hot packs, and hypodermics of ergotole and pituitrin. Convalescence was retarded by a fat necrosis in the upper half of the abdominal wound, otherwise was uneventful. She has been entirely well since.

There are several points of similarity to be noted in these clinical histories. First, and most important, both were certainly intra-uterine pregnancies, as proven at the operations. As such they show the fallacy of the theory of Müller and others, that all these cases of "missed labor" are really in extrauterine rather than intra-uterine pregnancies. Second, in both cases the irregular position—transverse and breech—probably contributed to the inertia. Third, both the children lived on for several weeks beyond term, just so long as life was possible under advancing involution. "Involution; the retrogressive changes to their normal condition that certain organs undergo after fulfilling their function." (Gould.) The crisis of pregnancy had passed by as shown by the consensus of events; the course of childbirth began, normally, with discharge of the waters, then the vital powers, forgetting, as it were, that their main purpose—the emptying out of fetus—had not been done, acted as if it had been, and at once went on to finish the normal cycle of pregnancy, parturition and involution. That each uterus was in the final stage of the event was shown at the operation by the conditions there present; thinned walls, inertia after delivery, de-

structive changes in the placenta, etc. Fourth, in the first patient the major operation was a last resort in a ruptured uterus, and in the second patient was better surgery in the interests of the mother than delivery *per vias naturales*. Had the section been made earlier, immediately after term, the children might have been saved, but at the time of the first case the status of abdominal Cesarean section was entirely different from that of to-day, and in the second case the child was already dead *in utero* before the consultant was called.

The condition for which Oldham invented the term, "missed labor," is described by authors in practically similar language, and has been accepted into the terminology of Obstetrics. Lusk's definition ("Midwifery," *loc. cit.*) is perhaps as good as any other;" those cases in which the uterine expulsive efforts having been ineffectually made at full term without other result than the escape of waters, the uterine contractions finally subside, leaving the fetus *in utero*." This is precisely what happened in my two cases. I am unable to find Oldham's exact language, but so far as I am informed the term was original with him in one or more articles on the subject, printed in Guy's *Hospital Reports*, 1847, vol. v, pp. 10-11." Our latest text-books still retain his explanation of the condition, and the name he coined for it. I was curious to know who "Oldham" was, and what his credentials were for so general acceptance, for most of us know him only as his name is embalmed in the literature of midwifery. By the courtesy of the Librarian of the Army Medical Museum and Library (Washington, D. C.), I am favored with the following delightful "Obituary of Dr. Henry Oldham, appearing in Guy's *Hospital Gazette*, Dec. 6, 1902, vol. xvi, new series, p. 505."

"He was born in Tooting, Surrey, England, in 1815, and died in Boscombe, Bournemouth in 1902. A medical student at Guy's in 1849, after graduation he was appointed on the active staff of that hospital as physician accoucher and lecturer on midwifery and diseases of women. These positions he held until 1869, and from then until his death was consulting obstetric physician. Dr. Oldham contributed numerous and valuable papers on the work of his special department to medical journals, and at various times was President and Treasurer of the London Obstetrical Society. He was a successful and popular teacher, and a most impressive lecturer, fixing the attention of his crowded audience by his eloquence, the incisiveness of his style, and the charm of his fine voice and presence. His name still lives in the well-known (?) "Oldham" perforator. His industry was great, and we hear of his performing "the Cesarean

section" successfully, mother and child both living in 1850, an account which includes a description of the action of chloroform in the case, a comparatively new drug." It is also written of him that "he was a great walker, a very simple eater, and for the last fifteen years of his life never ate a bit of meat, fish, or fowl." A friend writes me, "I often saw his brass doorplate in 1870, on my way to Moorfields Eye Hospital." (How this little bit of realism helps to make all the world akin!)

Even from this brief biography, Oldham speaks with authority, and may well represent those great men of our profession, who "have come down to us from a former generation." *En passant* he also realizes the sad commentary, that hardly any public man is so soon dropped from memory as the physician; "laid in the grave and quick forgotten."

The case of Oldham, for which he used the term, "missed labor," is given in summary by Galabin, in his "Midwifery," 1886. Galabin was Obstetric Physician and Lecturer on Midwifery and Diseases of Women at Guy's Hospital, and a cotemporary of Oldham. "In the classical case of Dr. Oldham (*Path. Trans.*, vol. i), who first introduced the term, the fetus became disorganized and converted into a mass of bones and adipoceros matter, portions of which were discharged or removed through the os uteri for the course of three months from the date of full pregnancy. The woman then died, and the mass was found in an imperfect cyst formed by the abdominal parietes and the posterior uterine wall, the anterior uterine wall having been apparently worn through. The case is, therefore, open to the interpretation that an extrauterine sac may have ruptured into the uterus, though Dr. Oldham recorded that he felt the fetus *in utero* during life" (p. 321).

Dr. Oldham was certainly qualified to decide whether the pregnancy was, or was not, normal, and if he said it *was* normal, that is, intrauterine, his word ought to be conclusive.

In the absence of the original paper, I must take the history of Barnes' case as given by Lusk in his "Midwifery" ed., 1894. He says, "the case affords strong affirmative evidence of the possibility of the prolonged retention of a fetus dying before the end of gestation was reached. Mrs. B., aged thirty-nine, had borne three stillborn children. Five years later, in the month of October, the catamenia ceased. The movements of the child were felt between the third and fourth months. Between the eighth and ninth months there was a flow of blood from the vagina, which, however, ceased in a few days under the use of cold and styptics. At the end of three weeks the

bleeding returned, but became lighter at the end of a week, and then gradually disappeared. At no time were there labor pains. At the end of January pieces of bone began to come away, and portions of bone were removed by the finger and forceps after partial dilatation of the cervix. In February under chloroform, Dr. Barnes proceeded to empty the uterus. As the hand could not be got into the uterus Dr. Barnes extracted the fetus with his craniotomy forceps. The fetus was a compressed mass, bones emerging in the surface, the fleshy part greasy, soft and putrid. It presented the appearance of having reached the eighth or ninth month of gestation. The patient showed considerable shock after the operation, but rallied the next day, and eventually recovered. Dr. Barnes was convinced, not only by examinations made during the extraction of the fetus, but by the daily subsequent introduction of the sound, that the cavity was continuous with the cervix, and that the dense wall felt in no respect differed from the characters of uterine wall. To his mind, even a postmortem examination could hardly have made the case clearer. In the discussion which followed Dr. Barnes' report it was, however, suggested by Sir Spencer Wells and others that the case was really one of mural pregnancy" (p. 305).

That such an obstetrical contradiction as "missed labor," that is, failure of the uterus to expel a full-term fetus, exists is now proven by undoubted cases. These seem to belong to one of two varieties, each of which may stretch across into the other. First, those which are due to uterine inertia, pure and simple, like my second patient, and second, those in which labor begins, but is arrested by conditions of previous disease in the organs involved, as in my first patient. I like the classification by Hirst of the causes of labor into "determining" and "efficient." The first of these, determining, includes, of course, the main question, What is the primal reason for labor? Of the efficient causes Hirst says, "The contractions of the uterus are the essential, and are often the only, force employed in the expulsion of the fetus." In my first case the failure of labor is plainly due to interference with its "efficient" cause, that is, "essential" uterine contractions. But my recent case is not so easily explained. Though the inertia was not absolute, for there must have been some uterine action, enough certainly to break the membranes, why was there inertia at all? Granted that the irregular position was a contributing agent in arresting contractions; in my opinion it was only that and nothing more, otherwise every breech case would end in a "missed labor." The "determining" cause of labor was absent;

when the wise men find out what that is, then will the reason for the inertia in my patient be found also.

I feel myself incompetent to enter upon a scientific discussion of this topic, and must leave it to much abler men than myself. It is sufficient for my present purpose to avail myself of the opinions of some of our leading American authorities, as given in their textbooks. So far back as thirty years ago Hirst himself wrote "very many theories have been advanced (for the determining causes of labor), but as yet none have been accepted as sufficiently plausible or scientific to adequately explain the termination of pregnancy and the beginning of natural labor with such uniformity when the fetus has reached maturity." ("Am. System of Obst.," 1888, vol. i, p. 480.) A little later Edgar wrote ("Practice of Obstetrics," 1905), "The causation of labor is a very complicated question, and we are to-day ignorant of the actual determining factor, through the operation of which a uterus, after remaining comparatively quiescent for thirty odd weeks suddenly, and perhaps unexpectedly takes upon itself to get rid of a burden it has carried so long without rebellion" (p. 482). Eighteen years more are spent in laboratory and lying-in-room, theorizing, experimenting and observing, and then DeLee, conversant with the medical literature of the world, asks the question, "What brings on labor? Why should the uterus, which has carried the ovum for so many months, suddenly violently expel it?" And his final sentence on the topic is, "What the cause is that sets the uterus in action has been the subject of much speculation and investigation but nature still hides the secret." ("Obstetrics," 1913, p. 115.) Finally I quote the opinion of Polak ("Manual of Obstetrics," 1913, p. 132) "Why labor usually begins two hundred and eighty days after the first day of the last menstruation is not definitely known." (After summarizing the various probable causes—loose attachment of the ovum, uterine unrest at the menstrual period, excess of carbon dioxide in the blood—he continues), "The growth of the ovum, which becomes a foreign body, furnished a sufficient stimulus for continued muscular efforts, and, finally, the unconscious memory of tissue transmitted from generation to generation plays an important rôle in the causation of labor."

I have not the time nor opportunity to look up the bibliography of the subject, nor wish to burden this paper with extensive quotations from writers. The literature upon "missed labor" must be very scanty, since I can find no mention of the subject during the last seven years in "Obstetrics," of the "Practical Medical Series" edited by DeLee.

DRAINAGE AND DRESSING

BY

H. S. LOTT, M. D.,

Winston, N. C.

CONDITIONS and pathology do not change. Each decade brings its crew of workmen; and the "pendulum swings," because the workmen change.

Simple, direct methods in surgery accomplish most. The men who have achieved greatest success—life-saving success—have realized this fact and adopted such methods.

Two main points should always lead the surgeon, first, recognize a focus for attack, and, second, reach this focus promptly, remove it, if its removal is possible, and stop. The blind seeking for something which may, or may not exist, prolongs the anesthesia and taxes unduly the vitality of the patient.

Most especially in the abdominal surgery should this fact be borne in mind, for 'tis here that symptoms are most obscure and misleading, and that the temptation is greatest to locate the focus and establish a diagnosis after the incision is made. In yielding to this temptation the surgeon not only blunts his own sensibilities, but also obstructs the path of progress toward that refinement of diagnostic skill, which should ever be his aim.

Furthermore before making the incision, or at least before completing the incision, it should be determined, so far as it is possible, will the case be one for drainage, or will it not? *Nature's way is to drain*; drainage, therefore, in the surgery of to-day is a life-saving element. The peritoneum is the surgeon's friend, but even friendship should not be abused, and when its' surfaces have been ever so slightly soiled, and in small areas, a tiny wick to lead filth from this point gives our patient a better chance, and ourselves a better conscience. If the case should be one with pus and require the extensive freeing of adhesions then the simple, and ample, straight incision with an abundance of drainage, and the "wide open game" afterward, is, beyond a doubt, the best one to be played.

Drainage, therefore, and its distribution, is not a chance and haphazard procedure, but an essential, and a life-saving one. In the field of general surgery a simple clean gauze wick, after an amputa-

tion, will lead out the effusion of blood and serum, which is sure to come within the first twenty-four hours, and which, but for this wick, must remain and await resorption.

Within the pelvic and abdominal cavities, drainage and its proper and effective distribution is most essential in about all conditions urgently demanding surgical intervention. In many cases the most that we do is to anticipate Nature; and the manner of its placing indicates the skill and wisdom of the surgeon equally with any other feature of the operation. For instance, in pus cases of appendicitis, of which, to-day, there are comparatively few, the want of drainage is the want which both demands, and justifies, the operation. After finding and removing the appendix, all points for the possible accumulation of filth should be sought, free vent established for its egress, and a gauze wick carried to the remotest point of its travel. These gauze wicks may be placed between coils of intestine, between omentum and intestine, even to the opposite side of the abdominal cavity; and to the floor of the pelvis; and unless it is done, and this filth given vent, we have done very little for our patient.

In some cases, about as bad as pus cases could be, and after removing a very large part of the omentum, I have carried good-sized wicks entirely across the abdomen, well up under the lower border of the liver, and well down into the pelvis—and, once, in a case, which I remember very well, this distribution in all three directions was necessary; and while, at the time, it looked very much like invading foreign territory, I believe it contributed very largely to saving the life of the patient. Therefore, in pus cases, where it is of such vital importance, there is very little danger of putting in too much drainage, carefully placed; and I firmly believe that the danger is far greater of putting in too little.

In the placing of drainage the order of entrance to the abdominal cavity should be reversed. For instance, with the topography of the region well in mind, we pass two fingers through the abdominal incision, and working from a given point, carefully and systematically, seek in all directions even to the cavity's remotest limit for the focus demanding repair; this point once located, our efforts will be restricted to its limit, and their results will be far more effective.

Having accomplished our object and bearing well in mind the planes of cleavage which have led us to this point, our wicks for drainage should be placed reversely from *within out*, all seeking and making exit at the lower angle of the *primary straight* incision; and the direction of each well borne in mind for future reference. "It is the little things in life that count" and I know of no condition in which

care and precision are better worth the while, or will give happier results, than in the placing of drainage in pus cases of appendicitis.

The after-care of these cases is a matter of very great importance, and I feel that it is one about which we hear too little by prominent operators.

Dressings, and their proper doing, are of equal importance with the primary operation. With just what was done at the operation, and the distribution of our drainage, well in mind, the plan of each dressing may be pretty well outlined beforehand. This saves time, and as patients look forward to dressings with a great deal of dread, they should be done as gently, and as quickly as possible.

Each dressing should be done with strictly aseptic preparation—both of the dresser and the material used; not with parade and display, but with simple thorough cleanliness. In bad cases, left open, where the drainage is good and we have a wet patient and a wet bed, within the first twenty-four hours, the dressing should be changed at the end of that time. This is done simply for the sake of comfort and cleanliness, and the wicks are not disturbed at all.

After forty-eight hours very gentle traction may be made upon the wicks, bearing well in mind the direction of each; no force should be used at this time, just the weight of the hand being sufficient, and the patient should be given as little pain as possible, although the giving of some pain is unavoidable. Wicks, well distributed in such cases, should be largely left to loosen themselves, and there should be no hurry about their removal, the danger of removing them too soon and by force, being much greater than that of leaving them in until they are well loosened, and the bowel wall, with its tendency to slough has regained its normal tone. This cannot be safely counted upon until ten days, or two weeks have elapsed.

As to the use of irrigation in these wide open cases, I have used it, and I have dressed them to a closure without its use. That the irrigation destroys some granulations and that the filling in is done more slowly by its use is very true, but there are filthy cases in which I believe that it is best and in return for the delay and the longer period in bed the patient gets a much more firm cicatrix, with less likelihood of an obstruction or a hernia afterward.

The application of the bandage in the after-care of drained abdominal cases, is a very important feature. This bandage affords protection to the abdominal wall, preventing undue laxity of its muscles, and favoring firm union where the incision is made.

The many-tailed bandage is the best one to be used because it can be adapted more snugly to the irregular outlines of the abdomen and

pelvis and will stay in place with more certainty. In putting on the bandage it is best to have a nurse on the opposite side of the patient and with each tail drawn taut make the laps, *always from above down*, with the final one straight across the prominence of the hips. These laps should be drawn as tight as the dressings beneath and the comfort of the patient will allow and made secure by a good-sized safety pin, just within each iliac crest and a line of them up the center of the abdomen, just where the cross is made.

No two cases can be dressed exactly alike; the nature of the condition at the time of the operation and the distribution of the drainage, will separately govern each one. But the principle underlying all and the object in view, *remembering that the abdomen wants to put things out—this is its function*—and that we are only helping in a natural process, is always the same; the doing of just enough, and doing this with safety demanding thought, cleanliness and precision.

308 MASONIC TEMPLE.

THE RELATION OF PELVIC TO ABDOMINAL SURGERY.*

BY

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DISEASES of the appendix, gall-bladder, duodenum and stomach are known to be frequently associated with certain pathologic processes involving the pelvic organs, though as to some of them a direct relation of cause and effect may not be demonstrable.

During a period of ten years 1244 women were operated upon at the Mayo clinic at Rochester, Minn., and 92, 7.1 per cent., were found to have gall-stones(1).

The appendix vermiformis is found so constantly involved in and with diseases of the female pelvic organs that no suprapubic operation upon the pelvic organs of women is now considered complete if the appendix is not examined through the incision and removed if conditions justify it.

The importance of these intimate relations between pelvic and abdominal diseases has been evident to us as gynecologists for many years and has naturally resulted in broadening the scope of our work so that such associated pathologic conditions in the general

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abdominal cavity are usually discovered and dealt with at the same time that pelvic surgery is undertaken.

This relationship of pelvic to abdominal surgery has necessitated the extension of the scientific work in our national obstetric and gynecologic societies and has resulted in the name of the section of the American Medical Association being changed to correspond to existing conditions for you will remember that it is now called "The Section on Obstetrics, Gynecology and Abdominal Surgery."

The obligation imposed upon gynecologic surgeons is obvious for "the idea of any surgeon restricting himself to one-half of a cavity and to the organs within it is specialism run mad." There is and can be no dividing line. Any man who does pelvic surgery should be quite capable of doing any work in the upper abdomen, for nothing can be more difficult or require more skill than an operation for the removal of an intraligamentous cyst, old tuboovarian abscesses or the performance of a complete hysterectomy for cancer after the method of Wertheim.

Regional surgery in limited fields particularly in the abdominal and pelvic cavities implies in many if not in most instances that the operation has been incomplete and that the patient may not be cured because very important factors in the production of symptoms may have been overlooked.

The general surgeons, or the surgeons general and abdominal as some of them now prefer to be called, are wise in adopting a wide and comprehensive view of pelvic and abdominal pathology. They make vaginal and rectal examinations before operation and thorough intra-abdominal and pelvic explorations after the abdomen is opened and deal with diseased conditions wherever they find them. They deserve great credit and praise for such complete work and set an example that should be followed by all operators who venture to open the abdominal cavity for any purpose whatever.

There seem to be very good reasons for believing that many of the commoner intraabdominal diseases, such as appendicitis, gastric ulcer, cholecystitis, tuberculosis, etc., are the results of secondary infections of hematogenous origin, the organisms being conveyed from a local focus elsewhere. Frequently the mouth and tonsil may be the portal of entry, but it is not at all uncommon for such primary infections to occur through the genitourinary tract, particularly in women.

Systemic infections with pronounced local and general manifestations frequently originate from streptococcic, gonococcic and tuberculous diseases of the female genitourinary tract. Arthritis from

such foci is common and tuberculous and streptococcic peritonitis from this source you have all seen frequently. Now if it be true as E. C. Rosenow has shown that appendicitis, cholecystitis and gastric ulcer are the results of secondary infections and are hematogenous in origin why may they not be as readily conveyed from a focus in the pelvis as from one in the mouth or tonsils?

The acid vaginal secretion has been regarded as a protecting agency from the invasion of the female genital tract by infecting organisms. Krönig believed that it was germicidal. "We have heretofore looked on the acids of the stomach as destructive to such bacteria, but Smithers in a microscopic examination of gastric extracts from 2406 different individuals with "stomach complaint" showed that irrespective of the degree of acidity of such gastric extracts bacteria were present in 87 per cent." (2)

It seems very probable that while the common forms of pus-producing organisms have their proliferation retarded in an acid secretion that certain bacilli (often of the colon group) may thrive under such conditions.

Notwithstanding the normal acidity of the vaginal secretion, we now know that the vulva and the vagina may be, and indeed often are, alive with infective organisms and that these gain admission to the uterus and tubes, both with and without the aid of gynecologic tinkering. Such tuboovarian infections and the more or less diffused extension to the peritoneum give rise to acute inflammatory or suppurating processes which may ultimately become more or less completely walled off or encapsulated in a mass of exudates, forming a focus of altered organisms from which general systemic infections and intoxications may occur in a constant or an intermittent way. That changed morphologic and pathogenic qualities occur in such organisms under such circumstances Rosenow has demonstrated and that other changes back to type may occur also, seems to be possible just as a "sport" sometimes occurs in a plant which has been altered under cultivation.

These intricate bacteriologic problems must be left for solution to others who are equipped to solve them. As surgeons and clinicians we should feel bound to aid the work by providing material and clinical data whenever possible, but it is, from our standpoint, and from the standpoint of the patient much more important that we follow such pathologic processes wherever the trail may lead throughout the abdominal cavity, whether it be to the appendix, the stomach and intestine or the gall-bladder, and that we be not content with dealing with the primary portal in the pelvis, ignoring the secondary

focus and the disassociated but coincident lesions elsewhere in the abdomen.

The interdependence and concurrence of pelvic and abdominal diseases obliges us to admit that as gynecologists and abdominal surgeons we are not doing our full duty to ourselves unless we assume a broad and comprehensive attitude toward these correlated secondary lesions in the abdomen, nor are we doing our full duty to our patients unless we meet this issue squarely and search thoroughly through the abdominal cavity when operating for pelvic diseases, and remove any remote coincident source of disease or discomfort which may be discovered.

Only incomplete and unsatisfactory abdominal surgery can be done through small gridiron incisions and adequate exploration of the abdomen for associated diseases will in consequence be quite impossible.

Operations upon women for pelvic diseases and the removal of the appendix in an interval should be performed through an ample median incision so that the whole abdomen and pelvis may be explored by the introduction of the hand and forearm if necessary.

It is not difficult to palpate the stomach, duodenum and gall-bladder in this way and it will be only in very exceptional instances that the appendix cannot be brought into such a median incision for examination and inspection under the hand and eye. In rare instances a bound-down retrocecal appendix may not come readily into a median or right rectus incision, but its position and condition can at least be made out and on such rare occasions a supplementary incision may be made directly over it if necessary.

Some one may suggest that such general abdominal explorations are unnecessary if sufficient care is taken to make exact and painstaking diagnosis before the operation is undertaken. The answer is that no exact and unmistakable complete intraabdominal diagnosis before operation is possible.

One may easily be sure of certain pathologic conditions before operation, but to be certain of many of the associated lesions is quite beyond the power of mortal man.

Such exact differentiation is difficult enough in the female pelvis at times but in the upper right quadrant of the abdomen with the stomach and duodenum, the gall-bladder, the liver, the pancreas and the right kidney to choose from it is often quite out of one's power to say how many of these organs may be involved and which of them may be the chief or original offender.

Of course, it will be agreed that no such general abdominal explora-

tions should be done in the presence of an infection or through an infected field. The diffusion of infection would be inevitable and quite unjustifiable.

Certain emergencies, as for example, ectopic gestation with hemorrhage, Cesarean section, intestinal obstruction with toxemia and shock, certain hernias, etc., must exempt a patient from any manipulation which would prolong the operation or add to the risks which are already as great as may be borne.

In conclusion let me recapitulate by stating:

1. That incomplete abdominal and pelvic surgery is inevitable if an imaginary line is to be drawn at the pelvic brim beyond which the gynecologist and the general surgeon shall not go.

2. The best interests of the patient, the general surgeons and the gynecologists will be served by the adoption of a broad and comprehensive policy in dealing with intraabdominal diseases so that all of the pathologic conditions of the pelvic and abdominal organs may be discovered and dealt with at once when any abdominal operation is undertaken.

3. Such ends will be promoted by grouping the scientific workers in this abdominopelvic field in our medical societies and medical schools so that the study of and teaching about these allied and often interdependent diseases may be properly systematized and classified.

4. The experience of the last few years in the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association has been so eminently successful in bringing together those who are especially interested in abdominal surgery that it would appear to be wise for other similarly constituted societies to take the same broad view of the subject and make a like logical arrangement for the scientific work of such societies.

310 METROPOLITAN BUILDING.

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TUFFIER'S OVARIAN GRAFT.*

BY

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MORE than thirty-five years ago Lawson Tate advocated double oophorectomy. For many years his method obtained among the best surgeons, but as time passed the ravages which followed this operation brought about a reaction and led all thinking men to desire a safe operation for conserving the ovaries.

Numerous conservative operations consisting of leaving portions of the ovaries "*in situ*" followed Tate's work, but these operations have been in many cases unsatisfactory, and for two reasons.

The first reason is that 70 per cent.(1) of the operations upon the female generative organs are due to gonorrheal infection. Therefore, when you leave a diseased ovary or part of a diseased ovary in its normal position, the gonorrheal infection continues to develop in the subjacent area(2). Menstruation, sexual connection, abortion or parturition may so stimulate this latent infection as to produce a plastic peritonitis with a rapid formation of new adhesions and the conditions calling for the first operation now call for a second.

The second reason is that if a cystic or sclerosed ovary be left "*in situ*" when the other is removed, an increased function devolves upon the remaining ovarian tissue and further cystic degeneration is likely to follow.

In either condition it is not impracticable to remove an ovary from a "bed of adhesions" and implant it in a clean field with restoration of its function.

Among the first, and very probably the first who successfully transplanted ovaries was Robert T. Morris of New York. In his letter to me of March 11, 1915, he says: "the first description of ovarian grafting and the inception of the idea was published in my book, 'Lectures on Appendicitis and Notes on other Subjects' (G. P. Putnam Sons, 1895). It was one of my assistants, Dr. U. G. Schlapp, traveling in Europe, who gave the idea to European surgeons. He told them of my work."

* Read before the Medical Association of Georgia, Macon, Ga., April 23, 1915.

In the following year, Knauer and Chrobach⁽³⁾ of Vienna showed that the ovaries could be entirely severed from their normal surroundings and be successfully transplanted either into the broad ligaments or between the muscles of the abdominal wall. The extensive use and systematic study of grafting ovaries has been carried out by Professor T. Tüffier at Hospital Boujon, Paris, and I had exceptional opportunities to witness his work in his own clinic.

Tüffier emphasizes the fact that the ovary has two functions. First, internal secretion, which prevents the well-known symptoms of a condition for which I suggest the term *cachexia-oophorpriva*. Second, maintenance of the menstruation. If this latter is not maintained the general health is impaired and the skin becomes itchy and muddy from lack of elimination of certain poisons from the system.

Contrary to the position of Polak and Chipmen⁽⁴⁾, that "the natural conservation of the ovary consists in letting it alone," Tüffier removes the ovary and grafts it at will with excellent functional results. His work has extended over several years and is broad in its scope. He has grafted ovaries from more than 200 patients, from one woman to another, homografting, and even from the negro woman to the white, and *vice versa*. These have not proved satisfactory. In no case has a homograft taken, though over 100 operations of this kind have been performed. Good results, however, are obtained from autografting, the process of grafting a woman's ovary in her own body and 150 autogenous grafts have been done successfully.

The three conditions in which Tüffier's ovarian graft is indicated, are:

First.—Septic processes.

Second.—Cystic and sclerotic ovaries.

Third.—Fibroids of the uterus not suitable for enucleation.

In salpingitis the uterus is left in place, adhesions are broken up, the adnexæ are removed and one or both ovaries are grafted.

Where cystic ovaries are found, shell away the cysts; if sclerotic, simply remove and graft.

If fibroids are present so that all of the uterus cannot be saved, at least a third of the uterine mucosa is saved and covered over by a shell of uterine tissue. This is sufficient to maintain menstruation. Transplantation of one or both ovaries in whole or in part is done and a restoration of the menstruation is insured. In some cases of salpingitis, the ovary may be grafted to the stump of the tube

¹ Read before the Medical Association of Georgia, Macon, Ga., April 23d, 1915.

directly in contact with the uterus, in which case, pregnancy may take place, or it may be removed to a clean field between the rectus muscle and the parietal peritoneum.

The technic for Tüffier's ovarian graft is as follows: The abdomen is opened and all adhesions are broken up, the tube and ovary are held in the fingers, the gland is isolated and the pedicle is cut. The ovary should always be handled as little as possible. It is now wrapped in sterile gauze and laid aside. The tubes may now be removed and the raw surface covered over with peritoneum. This point is important. It insures the mobility of the uterus and restores the broad ligament to its normal state(5). If the ovaries be torn in freeing them, the rough edges are carefully cut away. Often portions of the ovary appear sclerosed or contain cysts, "but even in this state they may be grafted and the results are good." If the glands are not aseptic, they can be run through an alcohol flame. This, of course, does not render the ovary entirely aseptic, but sterilizes it sufficiently well to have it take. It is not necessary that all of the infection be destroyed. This latter procedure, however, retards the restoration of the process of menstruation longer than if this be done. Care must be taken that they be not burned and they should never be put in a hot solution.

In many of Tüffier's cases the ovary was grafted without splitting it. Alexis Carrel (who was present at the clinic, and to whom Tüffier gives the credit for teaching us how to graft tissues), suggested that it would be better if the ovaries should be split open before grafting. This opens the small cysts in the body of the gland and gives a larger surface for rapid and firm adhesions of the graft. These firm adhesions admit of almost immediate access of nutrition to the grafted tissue. After the pelvic work is finished, a small pocket is made between the rectus muscle and the peritoneum and the ovary is placed well down in this pocket, split surface in contact with peritoneum. A stitch can be taken in it to tack it to the wall if desired. This, however, is not necessary; the abdomen is closed in the usual manner. Symptoms of menopause follow and menstruation begins in five months.

I have been asked: "How long will the grafted ovary functionate?" Once the graft takes well; that is, once menstruation is re-established, there is no reason why it should not functionate until the menopause. Another question is: "How does the graft appear after transplantation?" In one of Tüffier's cases which I had the privilege of examining, four years after transplanting, corpus luteum was found, the vein and artery were large and

appeared normal, the epithelial and connective tissue conformed to the normal type of ovarian tissue. "What percentage of grafted cases are successful?" Of sixty-five cases without hysterectomy, thirty-seven were interviewed by Tüffier from one to six years after operation, and thirty-two out of the thirty-seven had periods regularly. This is $86\frac{1}{2}$ per cent., and as a general rule the period was more profuse after grafting than it was before.

I have under observation a number of cases which have been done since last August. I have grafted ovaries that were almost entirely cystic, have culled out the medium-sized and large cysts and planted the residue. Some of these ovaries upon careful examination, seemed hopelessly diseased and had been causing much pain over a long period of time. In these, the patients have been free from pain and the menstruation reestablished. I do not hesitate to say that this operation is one of the most satisfactory advances in modern surgery.

CASE I.—Mrs. G. W., operated on September 1. This was a case of pyo-salpingitis. A drain was inserted to the right of the uterus and free drainage took place. One ovary was grafted in a pocket under the left rectus. The other was infected and was thrown away. The drainage did not interfere with the grafted ovary. The patient has gained 15 pounds, is in good health and is free from pain. She menstruated the first week in February.

CASE II.—Mrs. G. L., operated on October 15. Pyo-salpingitis. Left ovary cystic and buried in adhesions; left tube infected and removed. Right ovary, right tube and appendix all buried in a mass of adhesions. Left ovary was grafted under left rectus. This patient was sewed up tight. About the fourth day the wound broke open and oozed a sero-sanguinous fluid for a week. She menstruated the last of February.

In summing up, I wish to recommend this method for diseases of the ovary. It should always be done in idiots, defectives and criminals instead of double oophorectomy. It may also be done in those cases which we wish to sterilize on account of contracted pelves and other conditions which render child-bearing impossible. Except for the fact that it does not allow pregnancy it fulfills all the requirements of an ideal operation. It can be easily and quickly done. The functions of the ovary, both in internal secretion and menstruation are maintained, and at the same time the ovary is placed in a clean healthy bed completely protected from subsequent attacks of gonorrheal infection. With a new and diminished blood supply sclerosis and cystic degeneration are prevented or retarded.

In the words of the noted French surgeon, Tüffier, "It is certain

that with the grafting of an ovary, the normal condition of the patient can be maintained."

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UNILATERAL IMPAIRMENT OF THE KIDNEY IN THE TOXEMIA OF PREGNANCY.*

BY

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CASE I.—Mrs. E. S., aged twenty-four, housewife, married three years, was admitted to the service of Dr. B. C. Hirst, March 15, 1915, six months advanced in her first pregnancy. She had had smallpox and measles when a child and typhoid fever ten years ago. Menstrual history normal.

On admission she complained of headaches, vertigo, dimness of vision, nausea, vomiting and restlessness. These symptoms began in the fifth month of her pregnancy and grew gradually worse until, in the words of her physician, prior to her admission, "her urine boiled solid and contained casts of all kinds."

The patient appears somewhat slow mentally. There is marked edema of the face and of the extremities, especially the feet and ankles. Temperature, pulse, and respiration are normal. Blood pressure is 178-145. The heart shows slight pulsation at the apex. There is a systolic murmur transmitted to the axilla and a marked accentuation of the second aortic sound. The eyegrounds show the small retinal hemorrhages of a moderate albuminuric retinitis. Chest and abdomen are normal.

March 16, 1915. Urine examination. Quantity for twenty-four hours is 1720 c.c. It is cloudy, straw colored, with a light, flocculent sediment. Specific gravity, 1015. Dense cloud of albumin, 14 parts to 1000. Many hyaline, light and dark granular casts, with a few cylindroids. No sugar. No red blood corpuscles. An occasional white corpuscle.

Blood examination shows 4,300,000 red corpuscles, 9000 whites, and 60 per cent. of hemoglobin.

* Read before the Philadelphia Obstetrical Society, April 6, 1915.

Patient put on regular eliminative treatment of sweats, catharsis, copious draughts of water and protein free diet.

March 19. Blood pressure is 166-144. Urine is cloudy with a light, flocculent sediment. No sugar. Specific gravity 1017. Albumin 12 to 1000. Hyaline, light and dark granular casts; few cylindroids; no mucus; no red cells, an occasional white cells.

A cystoscopic examination shows the bladder capacity to be 150 c.c. The anterior, lateral, posterior walls and trigone are normal in appearance. Both ureteral orifices show normal contraction and the urine excreted appears normal from both orifices. However, the urine from the right kidney contains many hyaline, light and dark granular casts, many renal epithelial cells, some of which show fat globules, an occasional leukocyte and red blood cell and a dense cloud of albumin; while the urine from the left kidney contains no casts, a few renal cells, an occasional leukocyte, and a light cloud of albumin.

March 20. Indigo-carmin functional test. 0.825 gm. of indigo-carmin was injected deeply into the gluteus maximus muscle and the excretion from the ureteral orifices noted with cystoscope in bladder. The excretion from the left ureteral orifice commenced in twelve minutes, no excretion being noted from the right at this time. Distinct blue discoloration from the left orifice in seventeen minutes, none from the right. Traces of blue were noted from right orifice in twenty-four minutes, when the examination was concluded.

March 22. Phenolphthalein test on whole urine showed 45 per cent. excretion the first hour and 13 per cent. the second hour, or 58 per cent. in two hours.

March 25. Blood pressure 160-142. Urine 1950 c.c. Straw colored and cloudy. Specific gravity 1012. Alkaline in reaction. No sugar. Albumin 6 parts to 1000. No casts, no cylindroids, no red blood corpuscles, an occasional white blood corpuscle, considerable epithelium, a few triple phosphate crystals.

The patient feels much better, sleeps better, headaches are less severe, and edema, especially of face and eyes, is much less marked. Treatment continued.

April 4. Blood pressure, 147-128.

April 15. Urine amber colored, cloudy, specific gravity 1013, with a trace of albumin insufficient for quantitative estimation, an occasional hyaline and light granular cast, an occasional leukocyte, considerable epithelium.

Patient discharged to care of family physician; to return for examination on April 27.

April 27. Phenolphthalein functional test. One tumbler of water given a half hour before the administration of the drug. One cubic centimeter (0.006 gm.) of the Hynson and Westcott preparation was injected deeply into the gluteus maximus muscle, and the urine collected separately in test-tubes containing a few drops of a 10 per cent. sodium hydrate solution, the catheters being passed 5 cm. up each ureter for this purpose.

Excretion from the left kidney commenced in seven minutes.

Excretion from the right kidney commenced in twenty minutes. These are essentially the same results as obtained by the indigo-carmin.

Considering the previous history and the clinical findings, the fundus changes, cardiovascular symptoms, and the blood pressure in the above case, it is probable that we are dealing, not with the kidney of gestational toxemia alone, but with a kidney previously injured by the toxins of smallpox, measles and typhoid. Upon these damaged kidneys fell the increased burden of excreting the products of fetal as well as maternal metabolism. Since recovery from the infections noted, their compensatory power, though reduced, proved sufficient to carry out any increased functional demands in the nonpregnant state and the patient was entirely unaware of any reduction in renal sufficiency. It was not until the onset of pregnancy that she or her physician became aware of it.

Since the examination was begun on the above case, two others have been admitted; the first with a history of having had eight eclamptic convulsions, two ante- and six postpartum.

With a view of determining whether or not any similarity existed between this and the first case reported, a similar examination was undertaken. This however, was not done until five days after admission, when the patient had been free from convulsions for four days, so the results obtained were not as striking as they might have been had such examination been undertaken earlier.

CASE II.—April 18, 1915. Blood pressure 150-130. A bladder specimen of urine shows a dense cloud of albumin (7 parts to 1000), many hyaline and granular casts, a considerable number of epithelial cells, some cylindroids and eight to ten leukocytes to a high-power field.

In this case the phenolphthalein test alone was used, 6 mg., or that contained in 1 c.c. of the Hynson and Westcott preparation being injected deeply into the gluteus maximus muscle. The bladder showed small petechial hemorrhages, which were especially numerous in the region of the trigone and base and probably traumatic in origin from forceps delivery. Capacity of bladder 170 c.c. No undue vesical irritability. The catheters were passed 5 cm. up each ureter and the urine collected separately in test-tubes containing a few drops of 10 per cent. sodium hydrate solution. Patient was given a glass of water, one-half hour prior to the examination. Distinct pink discoloration was noted in urine from *left kidney* in *eleven minutes*, none was noted from the *right kidney* in *thirty minutes*, when the catheters were withdrawn.

Catheterized specimen from the bladder showed three casts, two of which were granular and the third hyaline. One light granular cast was found in catheterized specimen from right kidney, none in that

from the left kidney. Ureteral epithelial cells were present in both, there was a pale cloud of albumin in both.

This is an example of the fact that impairment of function does not necessarily go hand in hand with pathological constituents of the urine.

April 19.—Phenolphthalein test on urine from both kidneys showed:

First hour.....	20 per cent.
Second hour.....	10 per cent.
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Total in two hours.....	30 per cent.

April 25.—Indigo-carmin functional test, 0.825 gm. were injected deeply into gluteus maximus muscle. Excretion from left kidney, twelve minutes. Beginning excretion from the right kidney in twenty-one minutes. Phenolphthalein on this date showed:

First hour.....	28 per cent.
Second hour.....	14 per cent.
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Total in two hours.....	42 per cent.

CASE III.—April 26, 1915. Twenty-eight years old, arrived at term when she was brought to the hospital in the ambulance. Had two children the youngest three years old; convulsions with first child. Six convulsions prior to admission, one very severe convulsion shortly after admission. Unconscious. Blood pressure 180-155. The cervix was dilated and labor induced by the insertion of two bougies and rupture of the membrane. In course of four hours the child was delivered by low forceps. Blood-count, white cells, 15,800.

April 26.—Urine from bladder by catheter showed many hyaline, light and dark granular casts, many renal epithelial cells, many leukocytes, some cylindroids and mucus.

She was put on regular eliminative treatment, consisting of sweats, catharsis, copious draughts of water and protein-free diet.

April 29.—The next day patient became semiconscious, and not nearly so restless. Blood pressure, 165-143. All indications of improvement.

April 29.—Cystoscopic examination: Bladder capacity enormously increased, 800 c.c.; bladder sensibility normal. The whole bladder showed appearances of cystitis especially in the region of the trigone and base the walls being hazy, the capillaries poorly defined, here and there fibrino-purulent flakes and many floating around in the watery medium distending the bladder. The margin of the internal sphincter was somewhat puffy and edematous. The right ureteral orifice was approximately three times as large as normal, oval in form and with puffy and edematous margins. The urine was excreted in an intermittent manner and was seen to contain small flakes of whitish material. The left ureteral orifice presented similar appearances but to a less marked degree.

Catheterized urine from right and left kidney obtained by passing

the catheters 5 cm. up each ureter showed a considerable number of short hyaline, light and dark granular and an occasional epithelial cast. The high-power field of the microscope was covered with cells, approximately one-third of which consisted of renal epithelial cells in various stages of degeneration, some being merely granular, and others showing distinct fat globules. The remaining two-thirds of the cells consisted of leukocytes, many of which were aggregated in small and large clumps. Judging from the morphological constituents from the two kidneys in this case, aside from the obvious ureteropyelitis, the pathological changes were of equal extent on the two sides.

After examining a case of this kind, one can readily see why Olshausen and Halbertsma considered that there was a definite causal relationship between pyelitis and eclampsia as seen in many of the cases examined by them, also why eclampsia was considered as being due to an infection. Albarran and Guyon have shown that where the ureters are dilated, as in this case, they permit of free transit for organisms, thus permitting infection of the pelvis and possibly of the kidney.

April 30.—Urinalysis, twenty-four-hour specimen 1475 c.c. Pale straw color, turbid, sp. gr. 1008, neutral reaction, *light cloud of albumin* (8 parts to 1000); no sugar, many hyaline, light and dark granular casts, no red blood corpuscles. *Very many leukocytes*, no crystals.

Phenolphthalein test, beginning excretion from left in nine minutes and from right in fifteen minutes showed:

First hour.....	10 per cent.
Second hour.....	5 per cent.

Total excretion both kidneys in two hours. . 15 per cent.

Phenolphthalein test, May 6, 1915:

First hour.....	12 per cent.
Second hour.....	10 per cent.

Total in two hours..... 22 per cent.

In order to determine whether the urea excretion would show analogous results, Dr. Wolferth, pathologist at University Hospital, examined a catheterized specimen from each kidney and found that in the first of the three cases reported, the urea concentration was the same on the two sides, while in the third it was somewhat greater on the left, than on the right.

In order to properly place the above facts a brief review of the subject of toxemia has been made:

As is well known the toxemia of pregnancy manifests itself in four chief forms, though all are probably due to one and the same cause: (1) The kidney of pregnancy, (2) eclampsia, (3) toxic vomiting, (4) icterus gravis gravidarum, according to the predominating symptoms and organs chiefly affected.

The most widely accepted theories in regard to the origin of the toxemia are: (H. Williamson of St. Bartholomew's Hospital, London).

I. Bacterial: occasionally organisms have been cultivated from the urine, blood and the placenta. This however is very unusual and probably represents a terminal infection.

II. Autointoxication: this has its chief support in the fact that at times the liver is most affected and especially the periphery of the lobules.

III. Ovular theory: based on the following facts: (1) Eclampsia occasionally develops at a considerable interval after the death of the fetus. (2) Frequency with which it is associated with hydatidiform mole. (3) Portions of villi have been found in the maternal blood stream of dead pregnant women. (4) Placenta is known to contain many powerful ferments. (5) The injection of extracts of placenta from both normal and eclamptic parturient women have produced conditions similar to eclampsia. Veit believed that the presence of placental cells in the maternal blood led to the production of antibodies, termed syncytiolysins and that if the toxins were produced in greater quantity than could be neutralized by these antibodies, the symptoms of gestational toxemia developed, from their effect on the vital organs, just as in an infection.

IV. The kidneys are responsible from degenerative changes and loss of secretory function.

Pathologically the renal changes are degenerative and not inflammatory in character, the two kidneys are considerably enlarged, the cortex thickened and pale, the medulla hemorrhagic, effusions of blood being at times found in the medulla and beneath the capsule. Examined microscopically the convoluted tubules are found to be most affected.

According to the severity of the case, the cells are found in various stages of degeneration, or entirely converted into granular debris, the lumina are often filled with casts. The glomeruli and the loops of Henle are less involved, the cells being somewhat enlarged, but the cell outline usually preserved. The vessels generally are dilated, and the connective tissue edematous, at times showing lymphocytic infiltration.

It is well known that the gravity of a given case diminishes proportionately to the limitation of the involvement, and that if one kidney alone or part of one kidney is involved, the likelihood of onset of threatening symptoms is less than in cases in which both kidneys are simultaneously involved to a like degree.

It is this so-called kidney of pregnancy which is of particular interest to us as a factor in gestational toxemia, on account of its accessibility and ease of obtaining definite data. There are two chief types of the kidney of pregnancy: (1) that associated with cardiovascular change, as in first case reported, with fundus changes, hypertension and edema, and (2) that in which the nephritic symptoms alone predominate, as in the second and third cases.

Although three cases are entirely insufficient to justify conclusions, the similarity of the results led us to seek an explanation which is proposed simply for corroboration and study by others interested.

Pyelitis it is well known is due to an infection (usually the colon bacillus) predisposed to by a hydroureter; the latter being caused by direct compression of the ureter at the pelvic brim. In 84 per cent. of the cases of pyelitis, the right kidney is involved and whenever both kidneys are involved, as shown by Olshausen and Halbertsma, the right is more affected than the left. Halbertsma has shown that a weight of 5 gm. compressing the ureter over a surface of 8 mm. is sufficient to prevent the flow of a volume of urine weighing 400 gm. It is evident that the compressing force is furnished by the uterus itself, and not by the fetus, for in the latter event, the disease would be most common in the last two months of pregnancy, while it usually occurs in the fifth and sixth months, at which time the largest circumference of the uterus occupies the pelvic brim. The right kidney is more frequently affected than the left, on account of the more common position of the uterus in the right oblique diameter of the pelvis.

The data from the three cases, here presented, at least suggest the possibility of a similar factor of pressure from the gravid uterus, since the condition usually occurs toward the latter part of pregnancy, affecting the right kidney more than the left, for the same reason as in the case of pyelitis. The symptoms of the toxemia at least of late pregnancy would thus be explained, according to this possibility in the same way as those of advanced nephritis, by the retention of substances, though of a different nature, which should be excreted. This diminished excretory power, or reduced function is due primarily to venous stasis, just as is seen in a mild degree in advanced heart disease, and to direct pressure of the gravid uterus upon the kidneys, the right kidney being more affected than the left on account of the position of the uterus. The vitality and functional capacity of the kidneys, and especially the right, being thus primarily reduced by pressure, permit of the accumulation in the system of the unknown toxins of pregnancy, in addition to those which should normally be excreted in the nonpregnant state and therefore undergo still further and more rapid degenerative change. To these toxins both kidneys are equally exposed and although both may be pathologically affected to a like degree, for reasons noted above, the right is functionally more affected than the left and possibly, were it not for these initial effects of pressure, they would not be permitted to accumulate and their disastrous results might not occur.

Aside from this theoretical possibility of pressure on the kidneys and their circulation and especially the right, leading directly to impaired function and to degenerative changes from pressure on the kidneys and indirectly from venous stasis; the examination of the functional power of the two kidneys is one of practical import of which the first of the three cases reported is an example, she being a primipara very desirous of giving birth to a living child if in any way possible. The other grave symptoms in this case would ordinarily have meant the interruption of gestation. The examination of the functional capacity of each kidney separately, which showed

one to be practically normal, seemed to Dr. Hirst to be sufficient basis at least for a trial of medical treatment. The subsequent course of the case has shown the course to be justified. According to Professor Schlayer of Munich the following conditions warrant the interruption of gestation.

(1) Uremia, in which most authorities are agreed.

(2) In the cardiovascular syndrome, in which hypertension and cardiac hypertrophy are present, due consideration is proper. If there is hypertension with hypertrophy in the first three months of pregnancy, the induction of abortion is justified, for in such cases there is usually a preexisting nephritis, with symptoms evident previous to onset of pregnancy—in such a case it is not justifiable to expose the patient to the possible subsequent dangers of pregnancy and labor.

If hypertension and cardiac hypertrophy come on late in pregnancy, then it is justifiable to interrupt pregnancy only in the presence of threatening symptoms such as, uremia, eyeground changes, marked hypertension and advanced cardiac involvement, advanced age of the woman, or cardiac insufficiency.

In most other cases one can safely permit pregnancy to go on to term under continuous control of the symptoms.

(3) Nephritic edema. This symptom should not indicate the interruption of gestation, except in the presence of other serious renal symptoms, or when the edema does not respond to rigid dietetic treatment.

It is hoped that the data here given may at least emphasize the importance of individual study of cases in gestational toxemia, and that the determination of the functional capacity of each kidney may be of aid in determining whether interference or noninterference should be the proper method of procedure in a doubtful case, for as Professor Schlayer has emphasized (*Schwangerschaft und Nierenleiden, Monatsschr. für Geb. und Gyn.*, 1913) the renal symptoms may be entirely inconsistent with the functional capacity of the kidneys so a diminished functional capacity should form the basis for the interruption of gestation rather than gross or microscopic findings.

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THE AFTER-RESULTS OF CURETMENT OF THE UTERUS.*

BY

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CURETMENT of the uterus seems to be so generally considered as such a slight and simple operation and is done so often by those who are not surgical specialists, that I thought it well to bring the subject to your consideration to-night by a very brief report of a few cases to illustrate one of the unfortunate results that may follow.

I shall not consider the most common and most serious result as every hospital surgeon knows it too well—that is the large class of cases infected by curetment and followed by either an acute septic condition, local or general, or by a chronic infection of the mucous membrane of the uterus and tubes and all the chain of resultant symptoms. Nor that much smaller class of cases of perforation of the uterus while cureting, which has occurred, I am sure, to even the most careful surgeon who has had a large number of curetments (but in most cases without very serious results). But I want to especially mention those cases of curetment done carefully and thoroughly (probably too thoroughly) which are followed by a persistent and marked diminution of the menstrual flow both in duration and amount and by the symptoms of dysmenorrhea and pelvic congestion at each period and by severe headaches. I will briefly mention three cases to illustrate the condition I mean:

CASE I.—Miss C., aged twenty-eight; saleswoman, menses regular; free, seven to eight days; marked dysmenorrhea, both before flow and during first two days; backache and leukorrhea.

Examination.—Nullipara, negative but for an enlarged and tender uterus in first degree retroversion.

Diagnosis.—Chronic endometritis.

Treatment.—Dilatation and thorough curetment and rest in bed ten days.

Result.—Period returned at normal time for three or four months but lasted only one or two days; was painful and very scanty and after that *no* flow but at regular period times, symptoms of pain, pelvic congestion and intense headaches. I used douches, tampons,

* Read before the Philadelphia Obstetrical Society, May 6, 1915.

iron (no anemia) and many other medicines including lutein freely; even dilatation of cervix in office with no results.

Patient refused another examination under ether and left my care not improved.

CASE II.—Miss N., aged thirty-eight; school teacher; menses regular; scanty, two to four days; marked dysmenorrhea.

Dilatation for dysmenorrhea and a light routine curetment done.

Since then, much less dysmenorrhea but menses only part of one day and severe headaches. This has not been much improved by constant treatment of all kinds extending over nearly three years.

CASE III.—Mrs. A., dilatation and curetment for chronic endometritis, also in this case, a right unilateral tubo-oophrectomy and appendectomy.

She lived away from Philadelphia and returned after two years to my care at the Presbyterian Hospital with history of very scanty periods and headaches and some pain in right side. Examination showed no abnormal condition to account for this but I decided to try another dilatation with insertion of Norris drain hoping to stimulate the endometrium, and on doing it, found the internal os almost closed by adhesions which were easily broken up by Goodell dilators.

A very light curetment showed a thin endometrium which was reported by pathologist as normal.

I may say that the pathological report on all these cases at first operation was "Chronic Hypertrophic Endometritis." This patient was operated upon in December last and has recently reported periods regular since operation with more flow and less headache but not yet normal. This patient has had no treatment since previous operation.

In none of these cases was any iodine or carbolic used after curetting. They were curetted with a sharp Sims curet followed by a Martin curet and the uterus washed out with sterile water douche.

I do not believe that my experience with these cases has been unique although I have not found in a brief examination, any reports of such cases or any warning in the text-books against such results or suggestions as to the treatment. When I began to do curetment, I remember well fearing the uterine walls would grow together should I curet too thoroughly and being laughed at by my chief, and for years I had no results that made me think of this again.

But these three cases in the past three years and especially the one I reoperated upon, have rather suggested that they may at least in part adhere and produce symptoms. I have considered them only from a clinical standpoint and briefly in the hope of arousing some discussion.

OBSERVATIONS ON THE INTRANASAL TREATMENT OF
DYSMENORRHEA.*

BY

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Philadelphia, Pa.

AT the request of Dr. Barton Cooke Hirst, I have been asked to detail the results acquired by me in the employment of this treatment. It would seem to you gentlemen that the rhinologist is encroaching on your field of work, when he claims to be able in some instances to cure, and in others to materially benefit these distressing and painful conditions which so many of the female sex are afflicted with. I wish to preface this short paper by the statement that we, as rhinologists, are not encroaching upon the sacred grounds of gynecology any more than we have encroached on the sacred grounds of ophthalmology, when Dr. Sidney Yankauer, Clark (1), O. Mayer (2), West (3), Polyak (4), and Bourquett (5), brought forth their intranasal operation on the lachrymal duct for dachrocystitis, which prior to that time was considered an ophthalmological condition. Both of these encroachments, if they may be so termed, are on identically the same line, that is in gynecological work the patient can be curetted, and put to rest, and the patient with continuous tearing can be probed with increasing sizes of the dilating probes, and if the conditions which he or she seeks for relief is not alleviated, then the ophthalmologist or the gynecologist is at a loss for further operative procedures to pursue in these obstinate cases. So therefore, as I stated in the beginning, it is not an encroachment, as the operation which I propose to describe can be done when the gynecologist has reached his last resource for relief or cure in obstinate dysmenorrhea, or, if he prefers, or if the patient prefers, it can be done in the first instance, with the hope in either case that it will relieve the painful and distressing symptoms to which these poor women are subjected.

The rhinologist does not claim to be able to effect relief, either permanent or temporary, in all cases.

In 1897 Fliess(6) was the pioneer; he attracted the attention of the rhinologists to the connection, which was up to that time unknown, between the nose and the genitalia and the adnexa. He pointed out that in the nasal mucous membrane there were certain areas which he

* Read before the Philadelphia Obstetrical Society, May 6, 1915.

called genital spots, located one on the tuberculum septi, an area about 1 mm. or possibly smaller, directly opposite the middle part of the middle turbinate, and the other on the anterior portion of the inferior turbinate on either side of the nose. If one observes, by means of reflected light and nasal speculum at the time of menstruation, these particular areas, he finds them slightly cyanotic, very sensitive to the touch of an applicator, somewhat swollen, and showing a tendency to bleed easily. Fliess' first experiments were with cocain, which in a 20 per cent. solution, was applied to the spots during an attack of dysmenorrhea. His observations were that the pains in the back and abdomen ceased after a five- to eight-minute application, and did not return until the effect of the drug had disappeared. If the anterior portion of the inferior turbinate on either side of the nose was touched, the headaches ceased, but it had no effect on the abdominal pains. If one side of the nose was treated with 20 per cent. solution of cocain, applied to both of the spots, the headache and the pain on the opposite side of the abdomen was relieved. Since then these results have been confirmed by Dr. Emil Mayer with menthol, cocain and caustics, and by Fliess(7) and Kuttner. Different applications have been made to these spots by means of the galvanocautery, bipolar electricity and finally with trichloroacetic acid, with varying results as to the succeeding menstruation, some of which have been painless, in others the pain has not been as severe as prior to the treatment, and in some cases there has been absolutely no result at all. Seifert following in the footsteps of Fliess came to the following conclusions:

1. There are many indications pointing to a direct relation between the nose and the sexual organs but, as I will cite in the history of one of my cases, the nerve path is unknown.
2. General circulatory and mechanical conditions have a greater or lesser modifying influence on the nose as a result of sexual conditions and functions.
3. Many pathologic conditions of menstruation coexist with a genuine nasal reflex neurosis or nasal hypertrophy with its results.
4. Uterine influence through nasal conditions may be largely explained by suggestion, by cocain euphoria, greater in certain individuals than in others, by relief of a nasal reflex neurosis and through the restoration of the general health as a result of restored respiration and relief of nasal congestion.

Seifert(8) in an article in a recent number of the *Zeitschrift für Laryngologie* on the critical study of the relationship between the nose and the sexual organs, has made reference to 296 articles written

at different times on the study of this relationship. Dr. Emil Mayer(9) of New York City in an article read before the American Academy of Ophthalmology and Oto-Laryngology, has been following this relationship ever since the fall of 1910, and has made a careful and systematic study of each case so treated, and I am taking the liberty of quoting freely from his paper. He cites in this article ninety-three cases which were treated by him in conjunction with Dr. Jos. Brettauer and, in summing up, his conclusions are as follows:

1. Permanent relief is obtainable by nasal treatment in from 50 per cent. to 75 per cent. of these cases.
2. Trichloracetic acid applied to the genital spots four times at intervals between the menstrual period is usually sufficient to obtain lasting results.
3. It affords an additional field to our therapeutics.

As to technic—the genital spots are thoroughly cocainized by means of a pledget of cotton wet in a 20 per cent. solution of cocain with adrenalin. This pledget is allowed to remain in contact with these spots for three minutes. They are then tested by means of a probe as to their sensitiveness, and if sensation is still found to persist, the application is repeated for another three minutes. Then a crystal of trichloracetic acid on the point of a probe is applied to the tuberculum septi, and then another crystal is applied to the anterior portion of the inferior turbinate on either side of the nose. The slough that forms disappears in about five days, when the same process should be repeated, so that in all four applications must be made between the periods. The patient is then requested to report her results at the next menstruation. If this is favorable, no other treatment is resorted to, except that two more reports are requested at the following menstrual epochs, and if these are favorable the patient is discharged. In cases where relief is slight, or not at all favorable, four more applications should be made between the menstrual periods, and if no benefit is reported, the treatment must be put down as negative.

The chief reason for not resorting to the galvanocautery in preference to trichloracetic acid is the danger of forming synechia.

Before going into the history of my cases, I would like to add that the usual nasal examination should be made, and where conditions exist, such as deflected septum, stenosis, hypertrophy of the middle turbinate, or enchondroses of the septum, these conditions should be corrected by operative procedures prior to the application of the acid to the genital spots.

I will now add the history of a few cases in which I have had the pleasure of applying this method of treatment.

CASE I.—K. S., aged thirty-nine, married, menstruation has always been painful, profuse, pains radiating down both legs, also considerable pain in the back during the commencement of some periods, compelled to go to bed, always suffered at this time with severe headaches. Examination of the nose negative, as to deflected septum or enlarged turbinates, sinuses clear. Jan. 24, 1914, application of trichloroacetic acid to the genital spots on both sides of the nostril. When patient returned for the second application she had contracted a severe cold, which raised a false hypertrophic condition of the inferior and middle turbinates of the left side of her nostril, so I considered it inadvisable to apply the acid to the side affected by the coryza, but applied it to the right side. Much to my surprise, when next she returned for treatment (the hypertrophic condition had disappeared), she complained to me of sharp pains in the left breast, these pains persisting for twenty-four hours. I bring this point up to show the undoubted connection between the adnexa of the reproductive organs and the nose. She then subsequently received three applications, and has reported regularly that menstruation is practically painless, with no headaches, although still profuse. Four years prior to her coming under my care, she had been curetted on two different occasions, with practically no relief as to the painful symptoms from which she suffered at her period.

CASE II.—H. F., aged thirty-two, married, severe headaches, pain in abdomen, back and legs, some nausea for the first two days prior to each menstruation, these symptoms were sometimes so severe as to compel her to remain in bed. Examination of nose reveals no deflected septum, no spurs, but both inferior turbinates swollen. Commencing Jan. 23, 1914, she received the four treatments, and three subsequent treatments, and reports that symptoms from which she suffered prior to the application were not observed. This has lasted for a period of six months.

CASE III.—M. R., aged twenty, single, has always suffered from menorrhagia ever since menstrual period was established, usually having flow every two weeks, which lasted for three to four days, pain radiating down legs. Examination revealed deflected septum, which was corrected by submucous resection, but no change in the excess menstruation. Was referred by me to Dr. Hirst, who advised a curettage, which was subsequently performed, after which there was a complete cessation of menstruation, and at the time at which the menstrual period should have normally occurred, she complained of a feeling of fullness in the head, lassitude, and nervous phenomena, and on two or three occasions a vicarious bleeding from the nose. She was then put on luetin, with no result, after which, February, 1914, I suggested the trying out of the application of trichloroacetic acid to the genital spots. After four applications had been made, she reported that at the time at which her menstrual period should have occurred, there was a slight showing, but she

did not return for the series of subsequent applications, and I have lost track of the case since that time.

CASE IV.—A. C., single, aged twenty-two, menstrual periods normal in the past. At this particular menstruation was attacked with a severe cold, which caused a cessation of the flow with an accompanying headache, cramps, bearing-down pains, and pains in the back and legs. Feb., 1914, examination revealed no deflected septum or hypertrophied turbinates, and for experimental purposes, applied 20 per cent. solution of cocain to the genital spots. In half an hour afterward the pains had entirely ceased, as well as headache. I cite this case to show the distinct nerve relationship between these genital spots in the nose, and the genital organs of the female, as this girl had no symptoms of dysmenorrhea, but her symptoms were due to the coryza which she contracted at that time.

CASE V.—L. S., aged twenty-five, single, suffered with dysmenorrhea ever since menstrual period was established, pains being very great, beginning first day before menstruation, and lasting for three hours after the flow was established, sometimes being so great as to compel her to seek her bed. She had been dilated and curetted twice with no relief. Feb. 20, 1914, application of trichloracetic acid four times between menstruation, much relieved, but has refused to have a second series of applications made, although she says she is decidedly better.

CASE VI.—R. R., aged thirty, married, has suffered with dysmenorrhea ever since birth of her first child, pains beginning forty-eight hours prior to menstruation, and lasting for at least two days after the flow has been established. Some vomiting, and on several occasions compelled to seek her bed for the first two days of the period. March, 1914, application of trichloracetic acid, result no recurrence, and discharged as cured.

1829 CHESTNUT STREET.

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A CASE OF MERCURIAL POISONING FROM A VAGINAL DOUCHE.

BY

EBEN FOSKETT, M. D.,
New York.

THE following case is reported from the service of Dr. Henry C. Coe, Bellevue Hospital.

The patient, S. H., aged twenty-two, single, was employed in a hotel. Said she was advised to take a bichloride douche, so she dissolved three tablets of 7.3 grains each in a cup of water and used a whirling spray syringe for the douche.

At once, she felt a burning sensation in vagina and felt so bad that she left the hotel and went to a physician, who ordered douches, an ointment to genitals, and albumin water by mouth.

Patient was seen by the writer in consultation three days later and removed to Bellevue Hospital. At this time the vagina and vulva were covered by a white sloughing surface, showing the caustic effect of the bichloride. Salivation was present and the mucous membranes of the mouth, pharynx and uvula were also white and sloughy. Temperature: 101° F., pulse, normal.

Urinary Symptoms.—Complained of dull pain in back in region of kidneys and passing very little urine which was lost in stool. On the third and fourth day, it was estimated at 1 ounce in twenty-four hours; on the fifth day, at less than 2 ounces; sixth day, $1\frac{1}{2}$ ounces; seventh day, 3 ounces; eighth day, 8 ounces; ninth day, 27 ounces; tenth day, 56 ounces. *Analysis*, on the fourth, seventh and ninth days showed albumin and granular and hyaline casts. Tested for mercury, but it was not present in urine.

The *treatment* consisted of hot packs every six hours, high colon irrigations, four times a day, salines by mouth, causing free catharsis for first few days. While in hot packs patient usually would sleep some and perspire a little.

On the fifth day, 12 ounces of blood was taken from a vein and replaced by saline solution. This blood was tested by Prof. George S. Wallace and mercury was not present. On the fifth day, patient had slight bleeding from mouth and on the sixth day, from nose. On the seventh day, bleeding from vagina followed the separation of slough, and there was hiccoughs and difficulty in swallowing. On the eighth day, incontinence of urine resulted, and she was very restless, sleeping little.

On the ninth day, she had bleeding from nose and mouth, and vomited blood clots. Throat very sore and edematous, following sloughing of surface. General condition very much worse and

mentally restless and irrational. At this time amount of urine passed had returned to the normal. On the tenth day, projectile vomiting occurred. There was mental restlessness, the patient became irrational, incontinent, with bleeding from nose, mouth and vagina. On the eleventh day, had blood clots and old blood in stools. Heart very weak, vomiting blood. During the night, patient failed physically and mentally and bleeding continued from stomach and intestines. She died on the morning of the twelfth day.

It is to be noted that although the mercury entered by way of the vagina, the mucous membranes in mouth were effected the third day, and apparently the mucous membrane of stomach and intestines were later affected, as shown by vomiting of blood on ninth and tenth days, and old blood in stools the eleventh day. As the physical and mental condition failed, the kidneys were secreting a large amount of urine, the acute suppression having ceased.

The mercury was apparently excreted by the mucous membranes as shown by the condition of mouth and bleeding of stomach and intestines in later stages.

121 WEST SEVENTY-THIRD STREET.

TUBERCULOSIS OF THE URACHUS.

BY

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(With three illustrations.)

IN the French, English and German medical literature but one instance of tuberculosis of the urachus is reported. The condition is therefore so rare that it may be said to have very little clinical or practical importance. However, because of its rarity and particularly because of the circumstance that in the author's case and the case previously reported, it was unassociated with tuberculosis elsewhere in the genitourinary organs, it is not without some scientific interest.

Dr. Thomas S. Cullen in the search of the literature incident to the preparation of his new book on the umbilicus was able to find the record of but a single case of urachus tuberculosis, namely, that of Dr. Ellsworth Eliot of New York. An abstract of Eliot's report was published by Briddon and Eliot in the *Centralblatt fuer Chirurgie*, vol. xxvii, p. 1014. Up to the time of Eliot's report nothing could be found in the literature bearing upon the subject.

The original article of Briddon and Eliot appeared in the Medical and Surgical Report of the Presbyterian Hospital of the City of New York, January, 1900. Their case concerned a woman nineteen years of age who gave a negative family and personal history as to tuberculosis. For five weeks before her entrance into the hospital there had been heat, pain and redness at what had been formerly a normal navel. Within two weeks after her entrance into the hospital a small swelling developed at the umbilicus accompanied by lancinating pains in the hypogastrium. There was marked bladder tenesmus and frequency. The swelling opened spontaneously and there appeared a discharge of urinous fluid followed by relief of

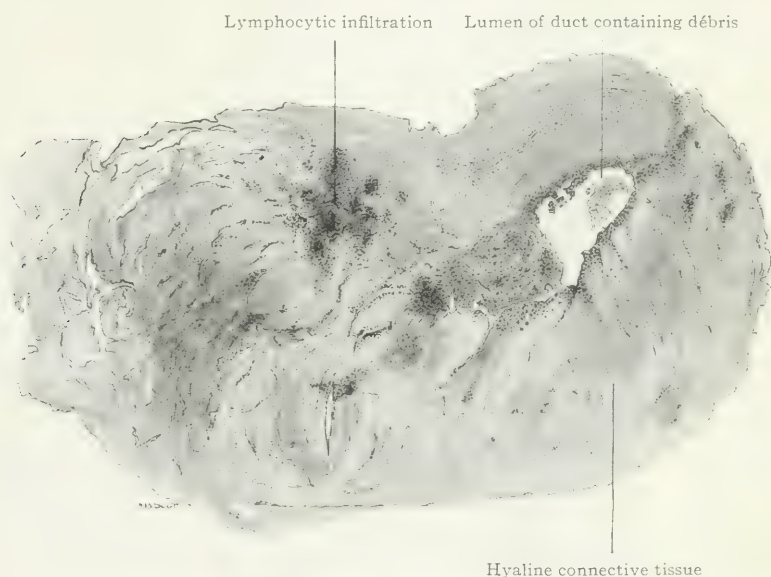


FIG. 1.—Transverse section of "duct."

pain. Practically all of the urine was thereafter discharged through the opening at the umbilicus. All of the internal organs were normal excepting the bladder which was quite tender. The urine was alkaline with a foul ammoniacal odor and contained albumin, blood, mucus, pus, bladder cells and triple phosphates. A sound introduced through the fistula passed freely from the navel to the bladder. Sectio alta revealed an urachus emptying into the bladder. On the posterior bladder wall were ulcers which upon microscopic examination showed none of the characteristics of tuberculosis. Eliot cauterized the ulcers and drained the bladder for a week, after which the urachus was extirpated without opening the peritoneal

cavity. Microscopic examination of the urachus revealed tuberculosis. The bladder fistula closed slowly. Briddon and Eliot believed this case to be one of primary tuberculosis of the urachus, the bladder tuberculosis representing a secondary involvement.

The writer's case occurred also in a young woman aged nineteen who gave the following record:

Family History.—Father died of cancer of the stomach at the age of fifty-one; one brother died during infancy of meningitis; history otherwise negative, particularly as relates to tuberculosis or neoplasms.

Personal History.—Typhoid at seventeen with good recovery;

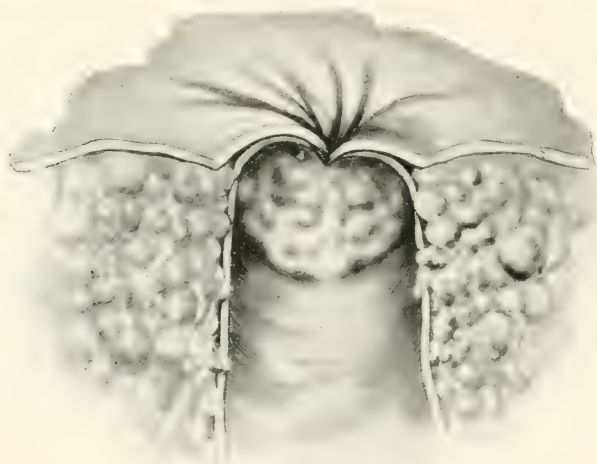


FIG. 2.—Ulcerated mass just within orifice of fistula communicating with patent urachus.

history otherwise negative; patient married two years and four months; one pregnancy, child living and well; at no time night sweats or protracted cough; no characteristic temperature history; no other evidences of tuberculosis.

Menstrual History.—Menstruation began at twelve; regular; duration five days and free; no change in type since marriage or labor.

Urination.—No increase in frequency, no nocturnal urination. Three diurnal urinations; never any blood or burning or stinging.

History of Illness for which Patient Entered Hospital.—This trouble began ten months before entrance. While working in a garden, pain was felt at a point in the midline of the abdomen between the symphysis pubis and the umbilicus. At this time patient noticed a

lump at the point designated the size of a small apple. There was not much actual pain nor soreness. The mass did not increase in size but the tenderness remained. This condition persisted for three months when a pin-point opening appeared in the midline of the anterior abdominal wall half-way between the symphysis pubis and the umbilicus. This opening discharged a clear watery fluid for about a week. Then a serous crust closed the opening. The opening again discharged after about a week, continuing to do so for one

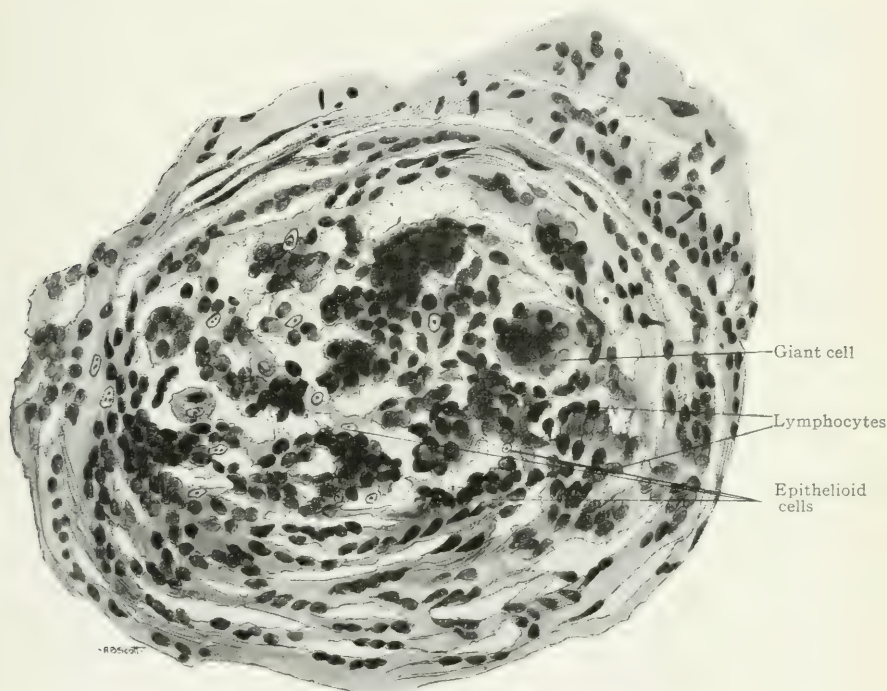


FIG. 3.—A Marginal Tubercle from "tumor" mass.

week and again the crust was formed. This process of closing and opening continued for several months. The size of the tumor did not change. The tenderness still persisted. There had never been any disturbance of the bladder, intestines or uterus. The discharge had always been free from odor. She is positive that the discharge never had a urinous odor.

Status Præsens.—The patient's general health was unimpaired. Urinalysis and physical examination of the chest and abdomen were negative. There were no evidences of pulmonary tuberculosis nor

of tuberculosis elsewhere. Through the discharging sinus below the umbilicus a small sound could be passed downward behind the symphysis pubis.

Operation.—The fistulous tract upon being dissected free was found to pass downward from the discharging orifice coursing in front of the peritoneum, crossing the space of Retzius and terminating in a thin cord attached to the anterior bladder wall in the median line and near to the vesicourethral junction. Upon being split open the definite tube-like structure was found to be thin walled, showing no evidence of inflammation or other pathology except near the external discharging orifice where an ulcerated mass about 2 cm. in width was situated upon the dorsal wall of the tube.

Microscopic Examination of Specimen.—Section No. 1.—Wall of Tubular Structure. This section shows a thick wall of dense connective tissue surrounding an irregular cleft-like lumen which contains small amounts of an homogeneous substance suggesting mucus. Projecting into the lumen from one side is a mass of highly cellular tissue infiltrated with small round cells and holding small amounts of the above-mentioned substance in its crevices. There is no distinct lining membrane to this lumen but the tissue wall is smooth as though it might have supported such a lining at one time.

Section No. 2.—Ulcerated Mass. This section shows a small amount of fat, upon which is a mass of connective tissue which in turn supports a layer of highly congested granulation tissue. The latter shows several well-developed and characteristic miliary tubercles within it and is infiltrated with many large round "epithelioid" cells.

Cystoscopic Examination.—Bladder distended with 8 ounces of water for examination; vesical sphincter normal in outline; trigone normal; both ureteral openings and the mucosa surrounding them were normal as to contractility and rhythm. There were no ulcers, tubercles or any other abnormalities upon the floor of the bladder. The vesical roof was examined carefully and this portion of the bladder was found to be absolutely devoid of any ulcer, tubercles, opening or any other abnormality of the vesical mucous membrane, and there was not the slightest hint of any communication with the patent urachus.

Chemical and Microscopic Urinalysis.—After operation as before the urine was normal.

Clinical Course since Operation.—Wound closed slowly; there have been no symptoms of any kind relating to the genitourinary organs; there is no evidence of return of the disease.

Conclusion.—It is probable that this case like that of Briddon and Eliot was one of primary tuberculosis of a persisting patent urachus. It is noteworthy that both of the cases of urachus tuberculosis reviewed occurred in young women. The incidence of urachus cysts is much more frequent in males than in females, the proportion according to Tilmanns being as seven to one.

331 NORTH DELAWARE STREET.

A CASE OF CHORIOEPITHELIOMA UTERI WITH LARGE BILATERAL LUTEINCYSTOMATA OF THE OVARY.

BY

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(With four illustrations.)

THE case to be described can hardly be called extraordinary since a number of such cases appear in the literature. The newer researches on the histogenesis of the tumor elements, however, make a discussion of the findings in our case of some value.

Mrs. M. G., patient of Dr. Ford, entered the hospital on May 1, 1914. She was at that time twenty years old, nullipara; she thought that she was four months pregnant until she noticed a slight discharge of blood from the vagina. She was curetted for hydatid mole on the day of admission. The microscopical picture of the curettings showed the usual findings of a hydatid mole. She was curetted a second time on May 21, 1914. The microscope revealed this time large amounts of syncytial masses but the diagnosis of malignancy could not be made from the microscopical appearance of the curettings. The patient however continued bleeding, her general condition became worse. Upon these clinical symptoms the surgeon decided to do a hysterectomy which operation was performed on June 6, 1914, *i.e.*, seven weeks after the first curettage.

The macroscopical description of the specimen shows the following details. A uterus 10 cm. long by 8 cm. width in the fundus, 6 cm. deep in the fundal portion. A narrow cuff of vagina, both adnexæ present. Uterus is uniformly enlarged, the myometrium measures about 4 cm. in thickness at the fundus. On opening the uterine cavity, several shreds of detached and loosely attached pearly gray tissue are seen. At the right uterine corner is an area of about $1\frac{1}{2}$ cm. in diameter where the myometrium appears to be invaded by a spongy tissue apparently arising from the endometrium. The endometrium on the left tube corner appears velvety, and shows a hyperplastic mucosa.

The loose or semidetached tissue in the fundus of the uterus previously described appears to be slightly invasive. Both tubes are hyperemic and thickened.

In the place of both ovaries we find two tumors of approximately globular shape, they measure about 14 cm. in diameter each (Fig. 1). The surface is grayish and smooth. On section both tumors are composed of a number of thin-walled cysts showing a fairly smooth inner lining (yellow), the cysts contain each about 500 c.c. of a slightly hemorrhagic serous fluid, the latter contains a few gelatinous clots and large amounts of serum albumin. In the wall of the left tumor one finds a small typical corpus luteum.

Microscopical Description.—A number of sections of the lower portions of the corpus uteri show a normal myometrium with the remnants of decidua spongiosa, *i.e.*, stroma with wide gaps which formerly contained uterine glands. There is no sign of decidual reaction in the stroma. The portions of the fundus showing the

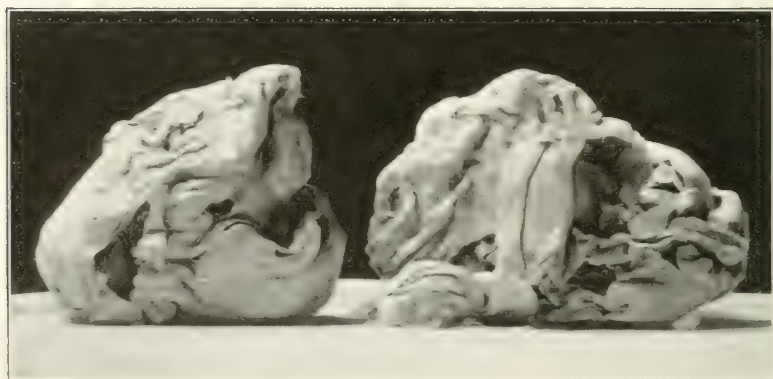


FIG. 1.—Bilateral ovarian lutein cystomas, collapsed. One-third natural size.

spongy tissue in the gross specimen reveal the presence of a foreign tissue embedded in the myometrium. A narrow zone of coagulated albumin surrounds a nodule of irregular outline, measuring about $1\frac{1}{2}$ cm. in diameter, penetrating the internal and vascular portions of the myometrium. The foreign tissue is composed of large masses of polyhedral and round cells with large distinct nuclei (Fig. 2). There are also cell aggregates composed of large cells with a purplish staining protoplasm and a rather distinct nucleus, most of them arranged in thick strands invading the musculature and filling the widened lymph spaces. In the tube corner we find a large vein plugged with a multiform mass of the above-mentioned foreign cells. There are numerous giant cells, ranging between 60 and 150 millimeters in size, sometimes in groups of four or five. There are no chorionic villi in any of the sections nor any elements resembling a hydatid mole.

Description of the Ovarial Tumors.—The walls of the different lutein cysts show generally a loose fibrous tissue with dilated

capillaries, this tissue contains numerous smaller and larger strands of elongated cells with small round nuclei; the cells are from 15 to 30 millimeters long and about 10 millimeters wide. Where there are only two or three layers of cells the aggregates are rather dense. In places we see these cell masses becoming looser in the center indicating the formation of a cavity; the same cells form the inner lining of the larger cysts (Fig. 3). They are arranged in several layers. Where the cells are scattered in the tissue they show numerous mitoses. Large amounts of neutral fats are contained in these cells as is shown by the scarlet R. stain. The Ernst stain gives no colloid reaction in the cells. In many portions of the fibrous cyst wall we see conglomerates of only a few cells scattered in the tissue. Many cells lining the largest cavities show signs of microbiosis.

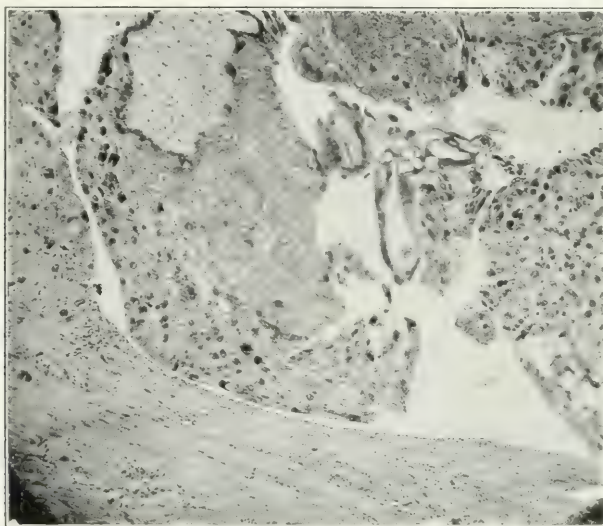


FIG. 2.—Masses of syncytium and trophoblast in the myometrium.

The mesosalpinx contains also small amounts of the above-described cells and a number of normal and cystic epoophoron tubules.

There can be no doubt that the uterine tumor is a chorioepithelioma. The simple invasion of the myometrium by trophoblast, syncytial wandering cells or multiform giant cells may occur in any case of normal pregnancy; they do not, however, substitute a portion of the myometrium to any extent as is found in our case. The giant cells which are surely originating from the syncytial masses do not constitute a sign of malignancy. If, however, we find weeks and months after partus or abortion, large masses of cells of fetal origin

with evident signs of active proliferation replacing portions of the uterus we cannot properly think of remnants of placental tissue. In this latter case we would find degenerated chorionic villi or small amounts of trophoblast and syncytial cells filling lymph spaces.

Aside from these considerations the peculiar tumor form of the ovary strengthened the diagnosis of the uterine growth. The clinical signs are of little value since malignancy of the neoplasm cannot be established by the unlimited destruction of the vital organs and fatal termination in this case. Cases in which metas-

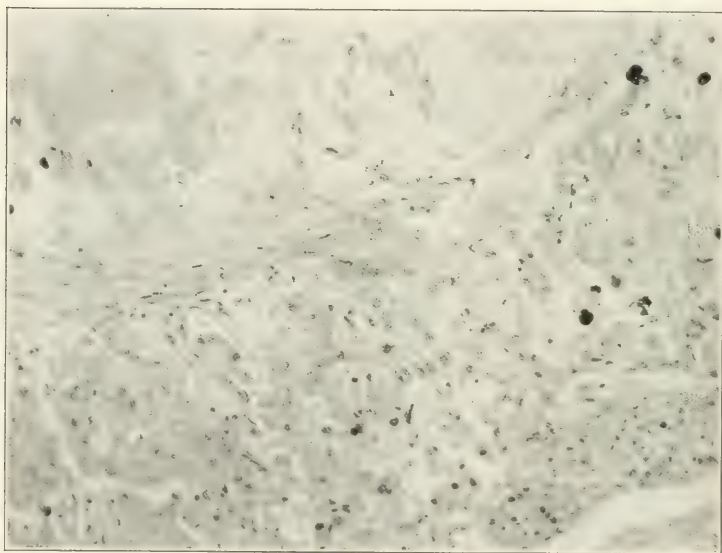


FIG. 3.—Lutein cells in the wall of the cystoma.

tases in the lung occur appear in a different light since chorionic elements were demonstrated in the lungs at postmortems of individuals who died during pregnancy or shortly after its termination. The term chorioepithelioma is therefore rather a morphological denomination than a clinical one. Some authors have tried to classify what is called chorioepithelioma, especially Ewing, but so far his attempt to show the possibility of putting morphological pictures in accordance with clinical symptoms has not been generally adopted. We therefore have no means of judging what the outcome would have been if the operation had not interrupted the natural progress of the case. Whoever examines a number of cases of chorioepithe-

lioma will find it very hard to give a prognosis of the case, since the spontaneous healing even of pulmonary metastasis has been described by a series of authors (Chrobak, Franque, Zagorjanski, Kissel, Ladinski, Kworostanski, Schauta, and others). The histogenesis of the ovarian tumors is not easily explained; the cells contain lutein in large amounts and neutral fats as the scarlet R. stain shows. Both of these properties are common to granulosa-lutein cells as well as to theca-lutein cells.

In explaining the histogenesis of the ovarian tumors we have to refer to the works of Seitz especially, Sabotta, Stratz, Bonnet and others; after the first appearance of Sabotta's work proving the

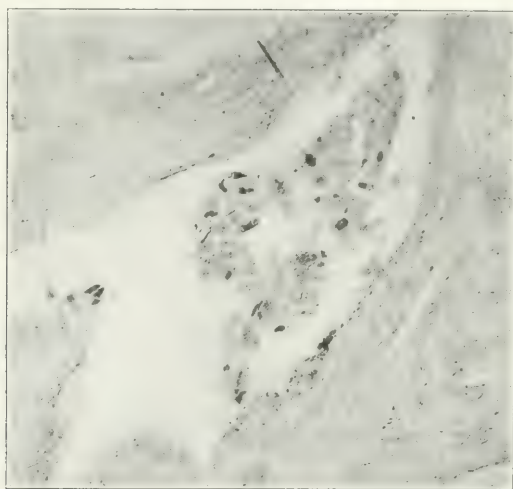


FIG. 4.—Trophoblast in the uterine vein.

origin of the granulosa-lutein cells from the epithelium of the Gräffian follicle in the mouse his opinion was generally accepted, but recent investigations seem to be inclined to derive part of the granulosa-lutein cells from the theca. Seitz's work has added greatly to the knowledge of the hypertrophy of the lutein tissue during pregnancy. He demonstrated that it is chiefly the theca folliculi which form hypertrophic lutein tissue appearing in the second or third month of pregnancy. His view has not been opposed and it seems natural that under certain conditions the same hypertrophic element might be the basis of such a tremendous increase in the lutein tissue as we find in our case. The demonstration of the origin of the cells would be greatly aided by histological differentiation of

theca and granulosa cells. John Willoughby Miller asserts that the corpus luteum menstruationis before full development contains no or only little neutral fat. He found that the corpus luteum graviditatis contains no neutral fats; but shows lime-salt deposits, and he further declares that the presence of colloid in the lutein cells forming the granulosa lutein tissue is a sign of their epithelial origin. This, of course, would enable us to decide on the origin cells. The Ernst stain in which colloid assumes a brownish hue while the cells themselves are bright yellow would demonstrate either epithelial (granulosa cells) or the theca (stroma) cell origin.

I examined a number of corpora lutea menstruationis and graviditatis for neutral fats, colloid and lime salts and the result is that all corpora lutea contain intra- and extracellular neutral fats although it is to be admitted that corpora lutea up to the time of their full development show less fat than regressing corpora lutea menstruationis and those of advanced pregnancy. I could not prove the presence of colloid in any distinguishable amounts either in the different corpora lutea or in the cells of the ovarian tumors, so this method of tracing the origin of lutein cells failed in my case. I used only frozen sections in my case for the scarlet R. stain in order to avoid possible errors which Miller found in Robert Meyer's method of staining paraffin sections for fat. The lutein cells found in the tumor were first described by Neuman, Vassmer, and Schaller-Pfoerringer subsequent to Seitz' research on the lutein tissue in the ovaries of pregnant women. Wallert thinks that the lutein cysts in chorioepitheliomata cases do not present any extraordinary features since small lutein cysts very often occur in normal pregnancy. There were authors who found only slight changes in ovaries after chorioepithelioma or hydatid moles, for instance Fränkel and Wallert. Some light is thrown on the histogenesis of our ovarian tumors by McCann's case who reported a postmortem on a woman performed eighteen months after menopause. The last pregnancy was nine years before death. The autopsy shows a uterus of the size of a pregnancy of about three months with chorioepithelioma and changes of the ovaries indicating lutein cysts, if the description of the autopsy were more detailed than it is in McCann's paper we would have a certain means of excluding the origin of these lutein cells on the ovary from granulosa cells because there is no formation of a corpus luteum in the menopause. The production of theca lutein cells being derived of the stroma ovarii might as well be possible during menopause. After due consideration of all these points we feel rather inclined to derive the lutein cells in our

cystoma from theca cells. We find in many places in our sections numerous islands of these cells scattered in the stroma showing no sign of degeneration, on the other hand, the cells lining the cystic cavities are undergoing regressive metamorphosis.

The lutein cysts are always multilocular and it is very improbable that so many corpora lutea should be present in the ovary when the uterine change takes place, besides these cystomata are almost always bilateral. We sometimes find several corpora lutea in different stages of development in the ovaries but that a large number of them should be present in both ovaries cannot be expected. On the other hand, the formation of numerous atresic follicles and subsequent corpora fibrosa is a common occurrence in both ovaries during pregnancy, and since Seitz proved their origin from the theca cells we have an easy explanation for these cells on hand. Schaller-Pfoerringer and others expressed their views that the lutein cystoma might be a carcinomatous degeneration of the lutein cells. Of course, the more rapid growth is no sign of malignancy. Besides, the cystomata disappear after the removal of the hydatid moles of the chorioepithelioma and they even shrink very much during the course of the above-mentioned conditions.

CONCLUSION.

We have to deal, in our case, with a chorioepithelioma uteri and bilateral lutein cystomata, a combination occurring very frequently. The ovarian tumors are only short-lived growths which show no sign of malignancy and undergo regression after the removal of the uterine condition. The cells lining the cyst are theca-lutein cells derived from the stroma ovarii. Generally speaking, the condition is an excessive formation of lutein tissue formed in normal pregnancy. But we never find such an excessive hypertrophy except in the case of hydatid moles or chorioepithelioma uteri.

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 WOMAN'S HOSPITAL,
 141 WEST ONE HUNDRED NINTH STREET.

OUTLET PELVIMETRY; WITH THE DESCRIPTION OF A
 NEW PELVIMETER FOR MEASURING THE TRANS-
 VERSE AND POSTERIOR SAGITTAL DIAMETERS
 OF THE PELVIC OUTLET WHEN THE TRANS-
 VERSE IS BETWEEN 8 AND 5.5 CM. IN
 WIDTH.

BY

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(With two illustrations.)

GRANTED an aseptic technic, the first principle in the scientific conduct of labor which shall provide the greatest safety to the mother and child, is a knowledge of the relative size of the pelvis and fetal body; yet a large proportion of physicians give little if any attention to its importance. While it is not possible to obtain accurate measurements of the child's head antepartum, it can to a certain extent be estimated; but the diameters of the pelvis can be very accurately measured; externally with the pelvimeter and internally with the hand. The relative size of the head and pelvic *inlet* has doubtless received more attention than the head and pelvic *outlet*; in spite of the fact that at the outlet difficulties are frequently encountered. It is here that injurious and impossible forceps extractions are often blindly attempted because measurements are not taken during pregnancy or labor. The outlet, except in the hands of experts, remains an unexplored field until after the head has become wedged in the lower pelvis; and even then it may not be recognized that the *outlet is so contracted* that it is impossible for the head to pass through it.

There are two reasons for this oversight: first, the importance of

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the pelvic outlet measurements is not generally appreciated; and second, the relative values of the respective diameters and how to measure them is not understood. It may appear strange that this should be so, for *contractions at the outlet are far more frequent than any other pelvic deformity*. At the Johns Hopkins Hospital, Dr. Herbert Thoms found that 5 per cent. of typical funnel pelvis occurred in 4000 consecutive labors. The frequent occurrence of difficult labors when the head has reached the lower pelvis, is the experience of every physician who practises obstetrics; but the reasons are often not recognized. We all recall instances where the forceps has been applied at this stage, and powerful traction has been made without knowing that the outlet was too small for the head to pass; and we are too familiar with the consequent disastrous results to mother and child. It must be admitted that there is a wide field for education in the line of appreciation of outlet de-

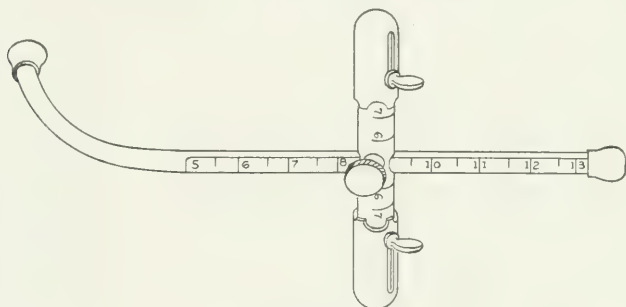


FIG. 1.

formity and its management. It must be more generally shown, what the available diameters in funnel pelvis are and how to measure them. Physicians who come to the antepartum clinics of the New York Post-Graduate Medical School and Hospital are especially interested in outlet pelvimetry. Recent books upon obstetrics describe the outlet diameters and the methods of measuring them; but it has been difficult to take the measurements of the two diameters upon whose relative lengths chiefly depend the passage of the head. These are the *transverse or tubero-ischial*; and the *posterior-sagittal of Klien*. The lower portion of the latter diameter, as also of the anteroposterior diameter of the outlet, is in reality an internal diameter; and the true lengths of both must in part be estimated; just as the length of the internal conjugate must be estimated from the diagonal conjugate; but with a simple instrument this is readily done.

It is not surprising that in general so little is known of these two important outlet diameters. The older practitioners were taught

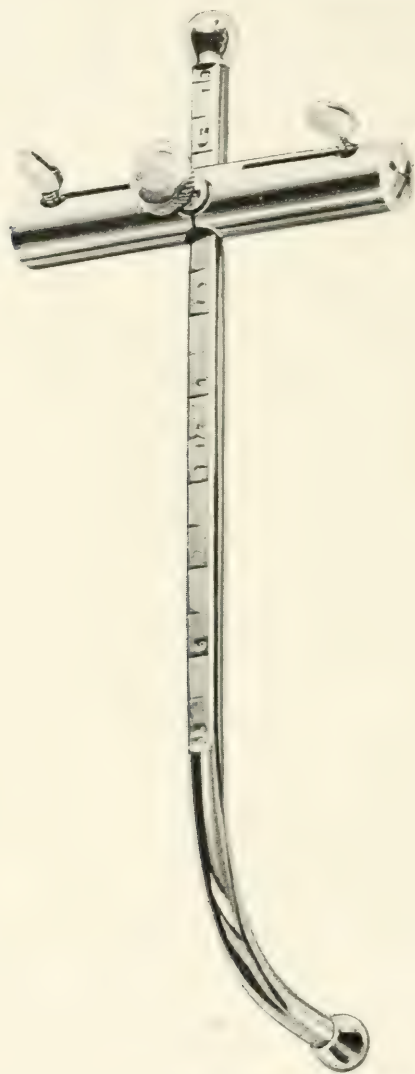


FIG. 2.—The instrument as it would *measure* a transverse diameter of 5.5 cm. and posterior-sagittal of 10 cm.

that the diameters of the “inferior” or “perineal strait,” were the anteroposterior or coccy-pubal; the bischial or transverse; and the oblique diameters, extending from the middle of the great sacro-

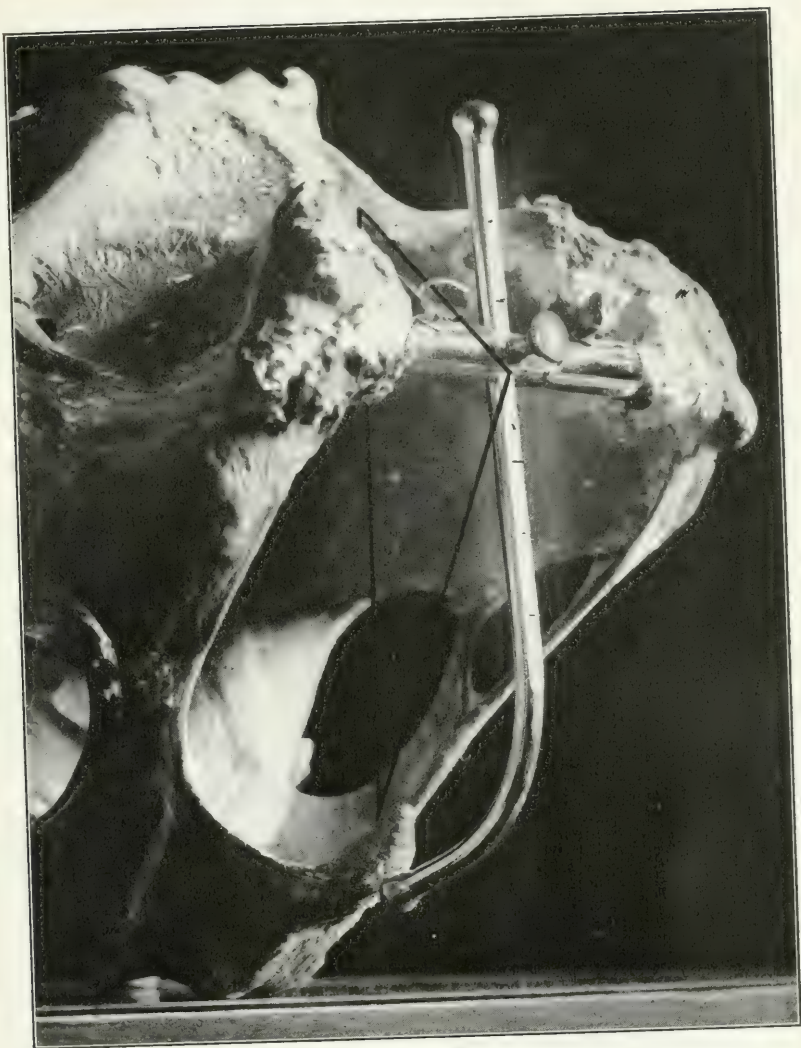


FIG. 3.—The instrument measuring in the bony pelvis the *transverse diameter of the outlet*, and the distance from the transverse to the *posterior tip of the sacrum*. The distance from the transverse to the *anterior tip of the sacrum* is the *posterior-sagittal diameter*. The distance in a straight line from the center of the transverse to the *sub-pubic arch* is the *anterior-sagittal diameter*; and from sub-pubic arch to the *anterior tip of the sacrum* is the *antero-posterior diameter* of the pelvic outlet. Geometrically these lines form a triangle.

In funnel pelvis the available outlet is practically between the transverse and the anterior tip of the sacrum.

Transverse	8	cm.	Posterior-sagittal	must be at least	7.5	cm.
"	7	"	"	"	8	"
"	6.5	"	"	"	8.5	"
"	6	"	"	"	9	"
"	5.5	"	"	"	10	"

sciatic ligaments to the junction of the ascending branch of the ischium with the descending ramus of the pubis. It was recognized that transverse contractions at the outlet were more frequent than anteroposterior contractions; and the reason was ascribed to the fact that the tuberosities of the ischium support the weight of the body in the sitting posture. They will recall the text consumed in describing the direction of the *irregular planes* of the inferior strait; and the difficulty which it presented because of its *different levels*. Referring to this, Dugès came very near the solution of the problem of outlet dystocia when he divided the inferior strait into *anterior* and *posterior portions*; the tubero-ischial diameter being the dividing line. But here his foresight stopped; for he says: "As this method of proceeding, uselessly complicates the question, we prefer considering the terminal plane of the pelvis, as represented by the coccy-pubal line, thus leaving out the lateral projections (at the tuberosities) altogether;" and the leading question was: "What is the direction of the line that extends from the point of the coccyx to the inferior part of the symphysis pubis?" Had reasoning stopped here, scientific obstetrics would have been deprived of the enlightenment which it has more recently received from Klien; who in 1896 promulgated the fact that in funnel pelvis an interrelationship exists between the width of the outlet at the inner lowest level of the tuberosities of the ischium (the transverse of the outlet) and the distance in a straight line from the center of this transverse to the anterior tip of the sacrum. So that if the transverse (which represents the available width of the pubic arch) is so narrow, the passage of the head is difficult. Compensation may be obtained however if the distance from this transverse to the anterior tip of the sacrum is sufficiently lengthened. He thus substituted for the classical, anatomical anteroposterior diameter of the outlet, the new *available* diameter which he named the *posterior-sagittal diameter of the pelvic outlet*.

In like manner he created (scientifically), a new diameter extending from the same center of the transverse, to the symphysis pubis within the vagina; which he named the *anterior-sagittal diameter*. Klien thus discovered the practical significance of the areas of the *different levels* of the "anterior and posterior portions" of the inferior strait into which it had been divided by Dugès; showed the relationship which must exist between the lengths of the newly created posterior-sagittal diameter and the transverse, tubero-ischial diameter which forms the common base line between the "anterior and posterior portions;" and demonstrated the

correlation of each, in outlet contraction, or funnel pelvis. The significance of these demonstrations has a very important bearing upon the outcome of labor in outlet contraction. In the *anterior portion*, the width of the pubic arch is the determining factor and in the *posterior portion*, the length of the posterior-sagittal diameter is its relative complement.

In pelves of normal size the subpubic arch is wide enough for the head to pass immediately beneath it; but with a narrow pubic arch, as shown in the table below, the head must pass, if at all, below the arch at a distance from it down the pubic rami, varying according to the degree of narrowing; and in order to do this, the tip of the sacrum must be located farther back than it is in its normal position. If sufficient compensation exists, it forms a *new available outlet*; the transverse, tubero-ischial diameter being substituted for the pubic arch and the posterior-sagittal diameter being substituted for the anatomical anteroposterior.

TO MEASURE THE PELVIC OUTLET DIAMETERS.

The pelvic outlet diameters are the *tubero-ischial* or *transverse*, the *posterior-sagittal* and the *anteroposterior*. The transverse measurement is made between the lowest inner margins of the tuberosities of the ischium. The anteroposterior is measured from the subpubic arch within the vagina, to the tip of the sacrum *posteriorly* and deducting 1 cm. to allow for the thickness of the sacral tip. The posterior-sagittal diameter cannot be measured directly, but may be approximated by carrying the tip of the pelvimeter backward over the tissues to the tip of the sacrum *posteriorly* and subtracting 1 cm. to allow for the thickness of the tip. It is *impossible* to measure this diameter without having a *fixed transverse base line*. It was for the purpose of providing this base, adaptable to the varying widths of the transverse, together with a means in a single instrument for measuring from this base to the sacral tip *posteriorly*, that the new pelvimeter was devised.

According to Klien (113 cases) the *normal* measurements of the outlet are:

	Cm.		Cm.
Transverse.....	11	Posterior-sagittal.....	9.95
Anterior-sagittal.....	6	Anteroposterior.....	11.5

According to Williams, in 185 normal pelves, the measurements were as follows:

	Cm.		Cm.
Transverse.....	10.5	Posterior-sagittal.....	7.5
Anterior-sagittal.....	5.0	Anteroposterior.....	11.5

The latter measurements correspond with our own as taken at the New York Post-Graduate Medical School and Hospital. (Occasionally the transverse diameter measures a little over 8 cm. but the posterior-sagittal generally measures 7.5 cm. and it rarely happens that great difficulty is experienced in these cases during labor.)

The normal length (Williams) of the transverse, tubero-ischial diameter as measured in the living subject, *i.e.*, over the tissues, is 10.5 cm.; and the normal length of the posterior-sagittal diameter is 7.5 cm. Spontaneous birth of the head is still possible with the tubero-ischial diameter shortened to 8 cm.; the posterior-sagittal remaining 7.5. If the tubero-ischial diameter is shorter than 8 cm. the head will not pass unless the posterior-sagittal is lengthened.

If the tubero-ischial 8.0 cm. the posterior-sagittal must be at least 7.5 cm.

If the tubero-ischial 7.0 cm. the posterior-sagittal must be at least 8.0 cm.

If the tubero-ischial 6.5 cm. the posterior-sagittal must be at least 8.5 cm.

If the tubero-ischial 6.0 cm. the posterior-sagittal must be at least 9.0 cm.

If the tubero-ischial 5.5 cm. the posterior-sagittal must be at least 10.0 cm.

—(Williams)

But these compensations may not be present; and to add to the difficulty, the child's head may be unusually large and hard so that it will cease to advance when it has reached this plane of the obstetric outlet; and if the forceps is applied, fatal injury may be done to the mother and child. Especially is there danger of rupturing the symphysis; fracturing the child's skull; producing paralyses; or brain lesions which may continue through life. This is a condition which demands more than a passing notice. It is the key to the obstetric mechanism which oftenest confronts us. The child's head becomes fixed in the lower pelvis, too large to pass through it; and notwithstanding the certainty of inflicting serious injury from compression and lacerations; or death from these and sepsis; the forceps is frequently applied in the blindest manner without regard to the relative size of the pelvis and head; and even without consideration of the position of the head. The pelvis can be very accurately measured; and the occipito-frontal diameter of the child's head can often be quite accurately measured with a pelvimeter through the abdomen; from which the length of the biparietal may be estimated. In this way we may obtain a fair knowledge of the length of two of the cephalic diameters. If the pelvis is found antepartum to be inadequate for the passage of the head, we are then forewarned that special treatment is necessary. Either the child's head must be prevented from obtaining its full size, by

inducing labor at an appropriate time; or if one does not elect to do this; pubiotomy or Cesarean section should be anticipated, to spare the mother and child the injuries incident to the attempt at a destructive forceps extraction. The size and molding capacity of the head are always the least known factors; knowledge of the character of the uterine pains; and the mother's power of assistance may practically be disregarded; for a case of this kind will be at least a difficult forceps case, the patient being under an anesthetic. Every case should be measured antepartum; but this does not mean that every case will be difficult. By knowing the measurements we can at least be informed as to the pelvis which are of normal size and in which normal labor may be predicted; and as to the pelvis which present outlet contractions, or in other words are *small in their outlet diameters, funnel shaped*.

The question is asked what shall be the treatment of extreme cases which are either recognized antepartum or not until labor is well advanced; by physicians who have had no experience in pubiotomy or Cesarean section; or where the case is far removed from a hospital or assistance? The answer must be the same as where under similar conditions the dystocia is at the inlet.

If the forceps without too great compression and without too great traction is ineffectual; craniotomy must be done; for it is better to spare injury to the mother if possible; where the death of the child is inevitable. Axis-traction forceps may be able to drag the head through a certain degree of pelvic contraction, but if the advantage gained by compression is followed up by tightening the screw of the forceps, it will be found that the forceps has been converted into a cephalotribe. We believe this is a common occurrence.

THE PELVIMETER.

The pelvimeter consists of a transverse bar, adjustable, with a scale measuring from 8 cm. down to 5.5 cm.; and an adjustable rod (the tip at its top unscrews) which passes through the center of the bar and curved at its lower end so as to pass around to the sacral tip. This is also marked at $\frac{1}{2}$ cm. intervals, from 5 cm. from the curved tip in a straight line, to 14 cm., the upper end of the rod. The cross bar is made adjustable by means of caps or hoods which may be drawn out to a total width of 8 cm. When these hoods are pushed in, the bar measures 5.5 cm. The caps may be fixed at any point by thumb-screws. The curved rod which passes through the transverse bar is also held by a thumb-screw. The combination

measurements of transverse and anteroposterior diameters may thus easily be made.

Between these points 8 and 5.5 cm. (on the bar of the instrument) are scale markings at 6 and 7 cm.; which means that when the depth of the scallop at the inner end of each cap is at the mark 7, the length of the bar thus represented by the caps will be 7 cm.; and when they are at the figure 6 it will be 6 cm. The first, lowest mark on the curved rod is at 5 cm. distance in a straight line from the tip of the curve. This was selected to aid in keeping in mind the *average* normal length of the *anterior-sagittal diameter*. (Williams 185 cases.) (The length of this diameter is generally given as between 5 and 6 cm.)

At the distance of 8.5 cm. from the tip of the curved rod to the lower anterior edge of the cross bar in a straight line the figures $8\frac{1}{2}$ are placed; because the measurement from this point on the cross bar to the tip of the sacrum *externally*, less 1 cm., represents the normal length of the posterior-sagittal diameter 7.5 cm. (the measurement to the tip of the sacrum *internally*). *The posterior extremity of the true sagittal diameter is at the tip of the sacrum on its anterior surface, internally; so that 1 cm. must always be subtracted from the distance actually measured externally.* Other figures up to 14 cm. are similarly placed on the rod at 1 cm. and $\frac{1}{2}$ cm. intervals. *They indicate the other distances to which the posterior-sagittal diameter must be lengthened to compensate for the variations in shortening of the tubero-ischial diameter.* Thus, for example:

If the reading for the

Posterior-sagittal is 8.5 cm. subtracting 1 cm. equals 7.5 cm.

Posterior-sagittal is 9.0 cm. subtracting 1 cm. equals 8.0 cm.

Posterior-sagittal is 9.5 cm. subtracting 1 cm. equals 8.5 cm.

Posterior-sagittal is 10.0 cm. subtracting 1 cm. equals 9.0 cm.

Posterior-sagittal is 11.0 cm. subtracting 1 cm. equals 10.0 cm.

USE OF THE PELVIMETER.

A good light and posture of the patient are essential, especially if the patient is stout and the tuberosities thickly covered. One should not feel that he must hurry in defining the landmarks. A good method of procedure is to place the patient in the *extended lithotomy posture* on a table, with the hips well over the edge, so that the tip of the sacrum may be palpated. It is well to have the sacrum rest on a pad to protect the patient from the edge of the table. The lithotomy posture may be maintained with leg holders; or by having the feet with slippers on, rest against the top of the backs of two

chairs, which are higher than the table; one chair being placed for the right and one for the left foot. This posture brings the tuberosities into prominence and *prevents the tendency* to measure the transverse diameter at a point *higher than the tips of the tuberosities* which would give a false measurement, viz., one *too narrow*. It is more convenient if the physician is seated. The instrument measures any distance transversely, from 8 cm. down to 5.5 cm. If the transverse diameter is apparently between 8 and 7 cm., the pubic arch may be palpated from above downward with the thumbs. When the greatest width is estimated in this manner or with the knuckles of the hand bent at the second phalangeal joint pressed between the tuberosities, or measurement is taken with a steel tape measure (if desired as a preliminary), the caps of the transverse bar are to be drawn out to their full extent of 8 cm. and trial made *to see if the distance between the tips of the tuberosities is as long as the bar fully drawn out*. If it is not, the instrument is taken off, and the sliding caps set for 7 cm., etc., and trial again made. (This is easier than attempting to measure the distance directly by holding the ends of the caps between the thumb and fingers and palpating and moving the caps at the same time.)

The bar now measuring the transverse diameter is held by the operator in position, and the *posterior-sagittal* diameter is next measured by bringing the tip of the curved rod around to the tip of the sacrum, *and subtracting 1 cm.* from the distance measured. A screw holds the curved rod in place in the transverse bar. For trial the curved rod may be fixed at the 8.5 cm. mark.

To locate the tip of the sacrum: Palpate the coccyx, by introducing the index-finger of one hand into the vagina; and making counter-palpation with one or two fingers of the other hand on the outside. The rectum should be empty. The coccyx is composed of four bones, which in my experience are partially movable, especially in young subjects.

Again, the coccyx is about $1\frac{1}{4}$ inches long (3 cm.); so that, bearing in mind its usual length, its upper termination will be approximately $1\frac{1}{4}$ inches above its tip.

TO MEASURE THE ANTERIOR-SAGITTAL DIAMETER.

Place the *tip of the short curve* of the curved rod against the subpubic arch, *within the vagina*; and bring the transverse bar to the level of the tubero-ischial line. Normal length, 5 to 6 cm.

TO MEASURE THE ANTEROPOSTERIOR DIAMETER OF THE PELVIC
OUTLET.

Place the *tip of the short curve* of the curved rod against the tip of the *sacrum* and measure in a straight line to the symphysis pubis *within the vagina*. Subtract 1 cm.

ESSENTIALS.

1. *Posture*: Place the patient in the exaggerated lithotomy posture with the tip of the sacrum well over the edge of the table.

2. Draw out the caps to the fullest extent of 8 cm.

3. Fix the transverse bar at the point $8\frac{1}{2}$ on the curved rod, ready for a trial measurement of the posterior-sagittal diameter.

4. Palpate the ischial rami downward with the thumbs to their inner lowest limit; at least to the level of the anus.

5. Make trial to see if the *transverse diameter* at this point is as wide as the full length of the bar. If not, slide both caps inward to the marks 7 or 6 cm., etc., and turn the screws to hold them.

6. Make another trial measurement.

7. Having measured the transverse, lay the instrument aside for a moment and palpate the coccyx to locate the tip of the sacrum. Keep a finger here or have an assistant hold his finger here, or place a small strip of adhesive plaster. The tip of the sacrum may also be palpated or located, first, by placing the patient on her side. Replace the transverse bar at the tubero-ischial level and see if the tip of the curved rod, fixed at the $8\frac{1}{2}$ -cm. mark will swing around to the tip of the sacrum; if so, the length of the *posterior-sagittal diameter* will be 7.5 cm., the normal length. If it does not reach this point, draw the rod down or push it up until it does reach it.

8. Do not forget to measure the occipito-frontal diameter of the child's head through the abdominal wall (normal 11.50 to 11.75 cm.) and subtract 2 cm., which will give approximately the bi-parietal diameter (normal 9.25 to 9.50 cm.).

I am indebted to Dr. J. Whitridge Williams for allowing me to demonstrate the use of my pelvimeter at the Johns Hopkins Hospital; and to Dr. George L. Brodhead for reviewing this paper.

PRIMARY (CELOIC) PROLAPSE OF THE VAGINA, WITH
(TRACTION) ELONGATION OF THE CERVIX VERSUS
PROLAPSE OF THE UTERUS, EITHER PRIMARY
NULLIPAROUS, PRIMARY OR COMBINED
PAROUS; OR PURELY SECONDARY.,

BY

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(With six illustrations.)

THAT the idea intended to be conveyed by this essay be the better understood, the author respectfully refers his readers to the many excellent articles by other writers and also to his own description of the pelvic floor "*anatomy and behavior*" in the virgin, in marital-nulliparity, in pregnancy, labor; and multiparity, published in the AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN, xlviii, No. 3, 1913, in which the pelvic floor is divided anatomically into (a) an *upper segment* (including the uterus) and (b) a *lower segment*. As a completion to the former the author begs to present this second essay on the minute mechanism of cervical elongation and prolapse of the uterus, in an endeavor to endow the prophylaxis with more importance and to render the corrective operative measures less empirical.

Hypertrophic elongation of the portio vaginalis uteri belongs to the hypertrophies and deserves passing mention only to avoid confusion with the real (traction) elongation of the cervix. It is a teat-like hypertrophy of that portion of the cervix which hangs free in the vagina and which may in extreme cases become slightly thickened, and so lengthened as even to protrude between the labia. It is said to occur most often in nulliparæ, supposedly due to repeated congestions perhaps, consequent on, onanistic practices or low-grade inflammation. These cases often have a narrow external os and possibly there may be some lengthening from the accumulation of an excessive quantity of coagulated cervical mucus. Leukorrhea is a common accompaniment. The vagina itself is usually of normal length and the vaginal fornices at their proper

height and position in the pelvis, as are also the fundus and corpus uteri, though occasionally they are somewhat atrophied. A careful bimanual examination usually easily decides the diagnosis and a wedge-shaped excision of the excess is the treatment.

TRUE TRACTION ELONGATION OF THE CERVIX.

The multiparous uterus is very prone to undergo some true traction elongation without or with some prolapsus of the corpus uteri as every operator can testify who does many supravaginal amputations.

It is generally conceded that the longer "*parous*" vagina (with the after-results of repeated labor, stretching and perhaps tearing

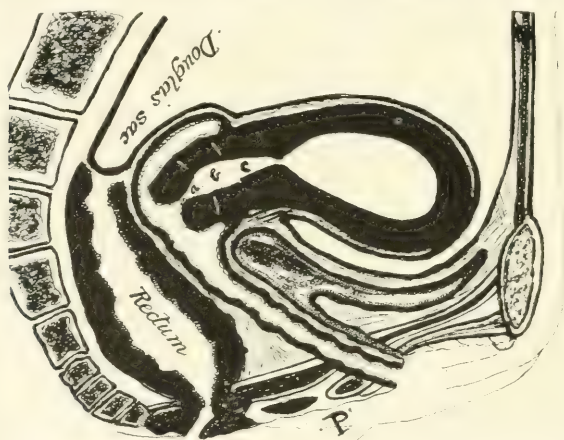


FIG. 1.—Diagram showing normal relations of uterus, vaginal walls, bladder, and rectum.

of the lower segment of the pelvic floor) does not prolapse circularly like the rectum but rather (*a*) the anterior vaginal wall prolapses (*usually as cystocele*); or (*b*) the posterior vaginal wall prolapses (*usually as rectocele*) or (*c*) both the anterior and posterior vaginal walls prolapse together.

Because of the difference in the height on the cervix of the attachment of the vagina, the prolapsing posterior vaginal wall makes traction on the posterior supravaginal and the prolapsing anterior vaginal wall on the anterior intermediary cervix wall.

This vaginal traction on the cervix naturally differs in results. It may cause either (*a*) cervical elongation or (*b*) prolapse of the uterus, (*c*) with the concomitant effect on contiguous organs and tissues.

If the upper pelvic floor segment supports be normally strong, it requires considerable vaginal traction on the cervix to permanently pull down a uterus held in place by an intact and elastic periparametrium or uterine ligaments, especially if the cervix is held well back in "normal" retroposition in the interischial spine line by well-developed uterosacral ligaments and the uterine corpus lies anteverted or anteflexed by the teres.

If the upper floor segment with the normal acute or right (anteversion uterovaginal) angle and a usually "larger" and "longer" multiparous uterus for intraabdominal pressure to act upon, successfully hinder secondary prolapsus uteri from occurring, then vaginal traction, if present, may actually bring about a *true traction elongation of the cervix*.

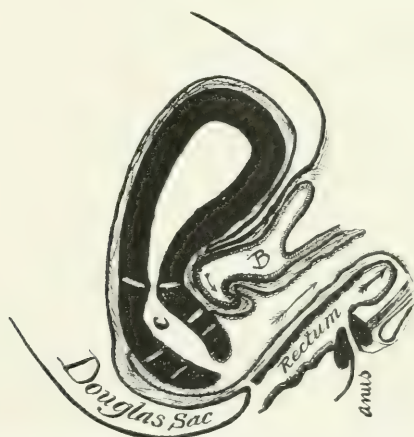


FIG. 2.—Diagram showing line of traction from rectocele and from cystocele.

In other cases the uterus though retroverted may still be held up at the normal height, by its own supports, or by strong adhesions or by, *e.g.*, a fibroid of the uterus; indeed the traction upward by the latter may lead to an "elevation" elongation of the cervix which must not be confused with the elongation due to vaginal traction downward, though occasionally a combination of the two causative factors may be met with in the same case.

The multiparous increased lengthening of the vagina is normal. It allows of a somewhat greater degree of uterine anteversion and also probably partially inhibits the traction by the prolapsing lower third of the "celvic" vagina from acting on the cervix and the occurrence of cervical elongation or prolapsus uteri by the traction being "spent" mostly (at least for a time) on the longer vaginal wall itself.

That this increased length of both the multiparous vagina and uterus is important, is also shown by the frequent uterine prolapses, which do not occur until after the marked vaginal shortening and uterine atrophy of senility have occurred.

(a) PRIMARY POSTERIOR VAGINAL WALL PROLAPSE and traction on the cervix in multiparæ, is usually preceded by a smaller or larger rectocele and because of the high vaginal attachment posteriorly to the supravaginal cervix, it not only may elongate the cervix but also drag down other attached and contiguous tissues and organs *e.g.*:

The vaginal fornices, especially the posterior may become more shallow and lower and may even partially disappear; while, due to supravaginal traction, the thinned and elongated cervix is found considerably lower, indeed the portio may in extreme cases even protrude through the introitus vaginæ and yet the fundus and corpus uteri be lying usually anteverted at, or nearly at, their normal level.

The peritoncum of Douglas' pouch attached as it is down the whole length of the posterior wall of the cervix and also for 3 or 4 cm. down the upper third of the posterior vaginal wall and then reflected on the rectum is dragged downward and elongated both by the elongating cervix as well as also by both the posterior vaginal wall and rectal traction.

(This Douglas' pouch elongation and deepening often forms the sac of a hernia and may contain sigmoid or small intestine or omentum, or both.)

The rectum with its stronger proctosacral attachment is not usually much dragged down in prolapse of the posterior wall of the vagina, except at the ampulla recti, which is frequently much dilated and atrophied by stagnating (often hard) feces and, covered by the posterior vaginal wall, may protrude through the vaginal introitus as a rectocele, the extreme prolonged filling of which causes increased traction.

In posterior cervical elongation there is also some *cervical elongation as a whole* and consequently also of the anterior cervix wall.

This concomitant elongation of the anterior cervical wall has some little influence on the vesicouterine culdesac anteriorly, which becomes lowered, though usually but slightly, because the lowest point of peritoneal attachment ends at a level with the internal os, *i.e.*, on a level above the site of the cervical elongation.

The bladder in that part attached to the concomitantly lengthened anterior cervix, is drawn downward by this and enlarged,

often forming a diverticulum (see picture) extending to the anterior end of the elongated cervix.

In one case operated at Cook County Hospital the writer had to repair a vaginovesical fistula which occurred spontaneously after curettage, caused presumably by catching this fold by a heavy volsellum, thereby causing pressure necrosis of both vaginal and bladder wall.

The ureters lying in the lateral parametrium about on a level with the internal os, may also be dragged down, causing a kinking and hydronephrosis, especially if there be old parametric induration bands.

The urethra being in the lower third of the anterior vaginal wall is but little if any influenced by purely posterior vaginal wall traction.

(b) PRIMARY ANTERIOR VAGINAL WALL PROLAPSE AND CYSTOCELE is, because of its anterior, higher, and more hidden position, much more frequent than diagnosed; especially in the lesser developed degrees.

The anterior vaginal wall attachment being to the intermediary cervix below the anterior *peritoneal attachment*, traction which only lengthens the cervix in its "intermediary" portion, at first may not drag down the vesicouterine culdesac to any degree; but as the bladder is lowered the attached overlying peritoneum (pericystium) follows.

Due to the concomitant lengthening of the cervix as a whole, Douglas' pouch, attached as it is to the whole length of the cervix posteriorly, is dragged down (if perhaps to a less degree), much the same as in the posterior vaginal traction.

The bladder, being attached to the upper half of the anterior vaginal wall and the whole anterior surface of the cervix, is markedly dragged down by both the anterior vaginal traction and the anterior cervical elongation.

The whole posterior bladder wall covered by the anterior vaginal wall forms the spherical cystocele. In extreme cases this may protrude through the introitus vaginae, especially when standing or when bearing down.

The bladder is frequently so much less firmly attached to the cervix above than to the anterior wall of the vagina below, that in cases of strong anterior vaginal wall traction in which neither the cervix elongates nor the uterus prolapses, the bladder may be entirely torn off the cervix by the prolapsing (cystoceloic) anterior vaginal wall.

The urethra in such cases may also be dragged down by the cysto-

cele, so that its long axis points to the coccyx, or even directly downward.

The often large cystoceles which occur in young primiparæ even after carefully attended expectant labors in which perhaps no rectocele whatever occurs, are very probably frequently due to a congenital weakness of the paracystium and subvesical, rectovesical fasciæ.

It is also acquired either by the trauma of labor, *e.g.*, after forceps or extraction, or may be due to inflammatory "subinvolutions" weakening.



FIG. 3.—Diagram showing point for amputation in hypertrophic elongation of the cervix, also a beginning cystocele.

(c) PRIMARY PROLAPSE OF BOTH THE POSTERIOR VAGINAL WALL AND THE ANTERIOR VAGINAL WALL simultaneously, with both supra-vaginal and intermediary cervical traction, may cause a combination of the changes described above in (a) and (b) and need no further description.

While there appears to be little doubt that cervical elongation is occasionally entirely unaccompanied by any prolapsus uteri, yet in most long-standing cases there is liable to be more or less permanent descent of the uterus also; indeed they not infrequently occur together, the prolapsus uteri often entirely overshadowing the cervical elongation.

PROLAPSUS UTERI.

This may be divided into four kinds: (1) primary prolapse in nulliparæ; (2) primary in the parous; (3) a combination of primary and secondary prolapsus; (4) purely secondary in the parous.

(1) *In virginal and nulliparous primary prolapse* of the uterus, the absence as a rule of any cystocele and rectocele traction forces one

to seek for other causes, *e.g.*, (a) congenital periparametric weakness or (b) acquired weakness or displacements.

Doubtless the normal retroverting action of a very full bladder on the corpus uteri combined with the antepositing action on the cervix and upper part of the vagina of the full, and often very long mesenteried, coiled sigmoid, which may even fill Douglas' sac, are at least important adjuvant factors, especially if both the bladder and rectum be "chronically" overfilled; though there is usually, probably, also some congenital weakness of the upper floor segment or periparametrium.

In retroversion the larger overfilled and more exposed bladder, peri- and paracystium are also occasionally subjected to undue intraabdominal pressure strain which is now mostly anterior to the retroverted uterus. This is well borne out by the subjective history of bladder pain and dysuria of some nulliparæ after lifting heavy weights, or a fall.

Primary nulliparous prolapse of the uterus, very gradual and at first unnoticed, may be due to repeated straining at stool or, as is doubtless sometimes the case, a sudden primary prolapsus occurs under sudden excessive intraabdominal strain.

(2) *In the primary prolapse of the "parous,"* while we must also think of congenital and acquired conditions as in nulliparæ, the acquired upper floor segment weaknesses due to childbearing are the most important.

The retroverted parous uterus usually enlarged by engorgement, invites prolapse by an increased exposure to intraabdominal pressure on the fundus while lying more vertically, thereby placing all of the strain immediately on the paracervical tissues.

An enlarged subinvolved (infiltrated) uterus of itself seems, from clinical experience, to have but comparatively little influence as a causative factor in primary prolapsus especially if anteverted; but the infiltration of puerperal infection via cervical abrasions or cervical tears (parametritis and paravaginitis), causes changes in the uterine ligaments, often resulting after resolution in an acquired weak, often slack and inelastic condition, of the whole upper pelvic floor segment and especially of the uterosacral ligaments, which may become lengthened, resulting in a permanent anteposition of the cervix and retroversion of the subinvolved and heavier corpus uteri.

The subinvolved uterus also exposes a much larger surface to the action of intraabdominal pressure, which latter is also often

increased by the longer intestinal mesentery so common in multiparæ.

The pelvic connective tissue induration (postinflammatory) may be of two kinds, first, that mentioned above, in which there is a loss of tone in the parametrium with stretching; and secondly a contractile scar tissue, giving rise to rigid bands (which often occur, in the uterosacral ligaments) resulting in a cervical retro-position and a pathologic anteversion, which hinders prolapsus. This must be borne in mind as a refutation of the idea that all infections predispose to prolapsus.

Not least among the very many causes of permanent weakness in the parous is the premature application of forceps or extraction before the os is fully dilated, the attendant often violent trauma stretching and tearing the parauterine and paravaginal tissues of the upper floor segment.

That the condition of the entire upper floor segment is of the very greatest importance is especially accentuated by the fact that a complete lowering of the whole floor and uterus can occur together, occasionally even the uterus prolapsing while still anteverted.

In the multipara we must also not forget that "primary" prolapsus of the uterus is often only an expression of a general visceroptotic tendency (Glenard's disease) either due to a widespread congenital weakness or a general subinvolution of the entire paratissues with a lowering also of the subdiaphragmatic organs, *e.g.*, the wandering liver of Cantani, the wandering kidney or spleen, elongated intestinal mesenteries generally and even acquired parietal herniæ. Indeed a lowering of all the organs and the development of a femoral hernia soon after the birth of the first child has occurred several times among the writer's cases in women who had before marriage done the hardest kind of work.

(3) *The combination of both a primary and secondary uterine prolapsus* is very common and gives the picture of a primary upper floor weakness; prolapsus, combined with anterior or posterior or both vaginal walls traction, influences on the cervix, bladder, and Douglas' sac from the action of the obvious "celes" (recto and cysto).

(4) *In the purely secondary prolapsus*, the upper pelvic floor segment is at first normally resistant; and the descent of the uterus, caused as it is entirely by the vaginal traction, may be very gradual, taking years to come down to any appreciable degree.

The height of the uterus in the pelvis may vary somewhat according to the emptiness or distention of the "celes."

While standing and violently bearing down, the cervix of the pro-

lapsing uterus in advanced cases may protrude through the vaginal introitus, but when lying down recede again into the vagina; or, indeed, rise almost to its normal height in the pelvis, an observation which probably gave rise to the Europhonic treatment of the ancients, which in its crudity is yet more scientific than the modern hurrying of women out of bed on the fifth day of the puerperium. It is a reproof to those practitioners who refuse her the aid of gravity in labor, thereby forcing her to abnormal peritoneal and paratissue strain, and then allow her to assume the upright position and go to work before involution in these same paratissues has scarcely begun.

When vaginal traction has entirely overcome the upper floor segment resistance, the uterus no longer recedes and may even protrude its whole length. The cervix in these cases is always elongated.

THE SUBJECTIVE SYMPTOMS of both upper floor segment and lower floor segment lesions vary in the individual case.

(a) Patients with only a simple cystocele or rectocele or both, may sometimes complain of more discomfort, bearing down, pelvic pain and backache, than do others with a very appreciable elongation of the cervix or even prolapsus uteri, though other pelvic lesions, e.g., adhesions that are undiscoverable bimanually, may at least in part account for this.

In *rectocele* the functions of the rectum which, normally is only a temporary receptacle for feces as the bladder is for urine, become more interfered with the longer the rectocele persists.

Dysdefecation and constipation are due to the more acute angle at which feces must turn to pass from the rectum through the atrophied dilated and anteposited ampulla recti via the retroposited anus.

The consequent repeated straining at stool not only helps the descent of the uterus from above but also causes constant venous engorgement of the pelvic organs and is liable to produce chronic catarrhal (mucous) colitis, sigmoiditis and internal and external hemorrhoids.

It is no uncommon complaint that patients have even to pass the finger into the vagina and push backward the loaded rectocele to evacuate the atrophied and dilated ampulla recti.

The large intraampulla masses of often hardened stagnating feces may cause, besides the catarrhal condition, rectal ulceration with infiltration along the paraproctal and retroperitoneal lymphatics with backache or, indeed, supralelevator (parametric, paravaginal or proctovaginal) abscess; or, in passing, perhaps abrasion

or painful fissure of the anal margin with infection (sublevator), paraanal or ischiorectal abscess; rupture of abscess intraproctally or externally on skin, with blind internal, or blind external fistula; or both, with complete anal fistula, or thrombosis venæ hemorrhoidalis superioris can occur and even, indeed, embolism and abscess of the liver. Keyes records the case of Mrs. McC.; multip., aged forty-nine, proctovaginal, fistula, lived only three days after operation. The autopsy revealed thrombosis, embolism and abscess of the liver. The paraproctal abscess had already ruptured into the vagina just above the perineum after literally stripping the vagina entirely from the rectal wall.

In still another case an enormous paraproctometric abscess



FIG. 4.—Diagram showing primary prolapse of the uterus.

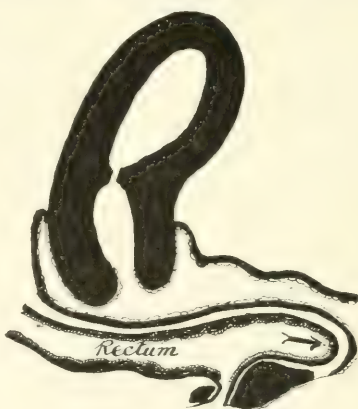


FIG. 5.—Diagram showing traction by rectocele.

followed the "ill-advised" injection of hydrogen peroxide by a very fine dropper into an external blind fistula.

In *cystocele* the residual urine is a common predisposing cause of catarrhal cystitis (diverticulitis, trigonitis), alkalinity, or even stone formation.

The close proximity also of the kidney pelvis to the often catarrhal colon flexures recently pointed out by Kretschmer (*Interstate Med. Journal*, Feb., 1915), also the ureters passing laterally to, and above the rectum; the often catarrhal ampulla of which is united directly to the bladder by the loose lateral lymphatic containing parametric and paravaginal tissues may account for many

of the cases of colon bacilli pyelitis and cystitis now attributed to ascending urethral infection via the (ectropinated) urethral meatus.

Leukorrhea is common in cases of elongated cervix and prolapsus, due both to the engorgement of descensus and also to the low-grade infection so often present and to which, indeed, the engorgement predisposes.

Objectively (a) inspection, especially while bearing down, usually reveals the rectocele or cystocele or both, and perhaps more or less of the portio and vagina-covered uterus.

(b) In "*simple traction elongation of the cervix*" both it and the vaginal fornices are lower and more accessible to the intra-vaginal finger; while the corpus and fundus are still appreciable about at their normal height in the pelvis and maintain their elevation even on deep inspiration.

(c) In *primary prolapsus* uteri after descent when standing the uterus does not again reascend in the pelvis on lying down or after cessation of the bearing down, or on release of the cervix from traction by the volsellum when on the operating table.

(d) In "*beginning*" *purely secondary prolapse* of the uterus due to vaginal traction, often combined with some elongation of the cervix, the whole uterus is dragged down by the vaginal wall, usually with visible enlargement of the rectocele or cystocele especially during straining; but the uterus reascends actively in the pelvis immediately the vaginal traction is relieved, *i.e.*, when the straining ceases.

In all of these latter cases there is usually also some "primary" aid from the intraabdominal pressure above. The author, to judge of the "secondary" effect alone, places the little finger of one hand through the anus into the rectal ampulla, and drags on the rectocele. By this means the true amount of vaginoceloic traction exercised on the secondary lengthening cervix or prolapsing uterus or both can easily be appreciated by the intravaginal finger of the other hand held in contact with the cervix.

(e) In complete procidentia uteri the earlier causative factors may have been primary or secondary or both.

The kinking of the veins causes much engorgement and rapid enlargement of the prolapsed uterus which partially or wholly protrudes from the vulva or hangs down full length between the thighs covered by the everted, often ulcerated, vaginal wall enclosing the urethra and bladder anteriorly; the Douglas sac (often containing herniated intestine) and rectum posteriorly to the covered uterus.

(1) THE PROPHYLACTIC THERAPY IN NORMALLY FORMED NULLIPARÆ demands a very regular evacuation of both the sigmoid and rectum; and bladder. This is especially important where there is any tendency to retroversion.

In rare cases the knee-chest position, night and morning for five minutes, and the application of a pessary (in the absence of inflammation or adhesions) if the cervix be anteposited, is occasionally successful in restoring the cervix in retroposition and the corpus in permanent anteversion.

After the application of the pessary the assumption of the knee-chest position, night and morning, should be supplemented by dragging open the buttocks to allow the ingress of air into the vagina to readjust the pessary.

Operation in many nulliparæ with retroversion has frequently revealed to the writer, a very marked, permanent laxity and elongation of the uterosacral ligaments and consequent anteposition of the cervix, possibly congenital or often probably acquired by the constant antepositing action of a chronically loaded, long sigmoid coiled in Douglas sac, demanding intraperitoneal shortening of the uterosacral ligaments, the performance of which in some cases resulted in immediate anteversion, without the aid of the Teres shortening; which latter, however, it is usually best to do also.

(2) *In pregnancy* the nonadherent and, indeed, even the slightly adherent retroverted and even partially prolapsed uterus usually, as it enlarges, rises out of the pelvis.

The knee-chest position for five minutes, three or four times daily, not only accelerates the anteversion and elevation but also helps to allay the often stubborn emesis, as well as helping also to prevent the incarceration under the sacral promontory with its distressing and dangerous bladder complications at about the fourth month.

Procidentia uteri in advanced pregnancy deserves mention. An interesting case of this occurred recently in the service of Professor J. Clarence Webster in the Presbyterian Hospital, Chicago, by whose courtesy I am able to report this case.

Mrs. C. C., aged forty-one, colored, para-iii; admitted November 19, 1914, at term, with a prolapsed uterus (see picture); the prolapsus had become very marked since the last three weeks, though the patient stated that she had had some prolapsus since the birth of the first child and that the second child came "breech."

The cervix being enormously thickened and protruding from the vulva presented besides its rigidity, a veritable obstruction, necessitating a Cesarean section, which, indeed, was much the safest,

avoiding as it did the cervix wounds via which infection could have ascended to the intracorpous parturition wound.

Mother and child left hospital in good condition.

(3) *Prophylaxis in labor* demands (a) scrupulous surgical cleanliness, (b) preservation of the (dilating) bag of waters not only as a cervix dilator but as pointed out years ago by Byford often as a perineal dilator also.

(c) To await entire dilatation or dilatability of the cervix before the application of forceps or extraction and thus avoid the "operative" tearing not only of the cervix but also of the paracervicium and parametrium (upper floor segment).



FIG. 6.—Dr. J. Clarence Webster's case of procidentia uteri at term in a para-iii, showing the enormously thickened cervix protruding from the vulva.

The unwarranted dragging of the child's head through an undilated cervix is probably the cause of 95 per cent. of the need of the maximum forceps traction; especially in normal-sized pelves, often literally tearing the uterus loose from the upper floor paratissues, with primary prolapse as a result.

(d) The careful delivery of the child over the lower pelvic floor segment, so-called perineum (central tendon) between contractions.

(e) *Prophylactic oblique episiotomy* beginning where an imaginary line drawn from the middle of the presenting part to the ischial tuberosity passes over the edge of the thinned labia majora, a

$\frac{3}{4}$ inch long incision with scissors, either uni- or bilaterally (during a pain) often avoids tearing of the "perineum."

These triangular, clean-cut, lateral, wound surfaces sutured with chromicized catgut, heal much more readily than tears.

All episiotomy wounds and perineal lacerations should be aseptically sutured immediately on completion of the third stage if the condition of the woman warrants it; even though the changed appearance of the tissues makes good coaptation difficult or even impossible.

During the puerperium the patient should after the fourth day lie on the side, and assume the knee-chest position for three minutes night and morning after the sixth day after labor, and continue the latter for twelve weeks, remaining in bed never less than ten days.

The binder now proven clinically to have no causative influence on the postpartum retroversion, is very helpful when properly applied in aiding the abdominal wall to lessen the size of the peritoneal cavity; the peritoneum and paratissues of which, have to undergo involution and adapt themselves to the lessened contents of the abdominal cavity.

The operative procedures preventive and curative will only be mentioned briefly as regards their principles.

The postpuerperal operations, *i.e.*, after involution is complete (about the twelfth week after labor) or somewhat earlier, may demand as the author has tried to show in the foregoing arguments (a) only lower segment floor repair (perineorrhaphy, colporrhaphy) if the upper floor segment be intact, or (b) upper floor segment repair or (c) both.

The perineorrhaphy, previously done in many ways by simple denudation, *e.g.*, Hegar's triangle, etc., by which one simply denudes part of the vaginal mucosa and sutures appears to the author much as if one denuded the skin over a hernia site and closed the raw surface by merely suturing it.

Shortening of the vaginal wall especially if done to any extent, also appears a very questionable procedure and liable to aid in causing early senile traction action of the vagina on the cervix which the operation for rectocele and cystocele should specifically seek to eliminate.

The true principle of perineorrhaphy which is now growing in favor is to reunite the rectovesical fascias and levator (supports of the rectal ampulla) and in anterior colporrhaphy the rectovesical fascia supports of the bladder, anatomically as in herniorrhaphy, layer by layer in order to remove the traction by the neglected

"celes" and restore as far as possible the vaginal "horizontal" and bring the vaginal introitus to its proper position anterior to the interischial tuberosity line.

Lower segment operations alone, *i.e.*, perineorrhaphy and colporrhaphy if done sufficiently early, *i.e.*, before material cervical traction has occurred, often suffice to arrest cervical elongation, and indeed uterine prolapse, especially in those cases in which the cervix is still well maintained at its proper height and position posteriorly and the corpus anteverted by a sufficiently strong upper floor segment.

These operations also do away with the daily straining at stool which not only increases the traction from below but also assists prolapsus from above by the increased abdominal pressure.

(In all cases, especially when nearing the menopause, the possibility of carcinoma should be examined for by curettage and microscopic examination of scrapings and sections and if found present there should be immediate removal of the entire uterus.)

A supplementary operation on the lacerated cervix of a healthy uterus also often assists by removing the baneful tendency of the woman to bear down, from this cause.

The vaginal fixation of the fundus of the healthy uterus under the bladder (Schauta) in cases of retroversion and prolapsus is often placing too much reliance for support upon the anterior portion of the upper floor segment and rectovesical fascia without sufficient regard to the conditions in the posterior.

Of the operations via the abdominal wall, the so-called Alquiè-Adams-Alexander operation by shortening the teres ligament in the inguinal canal, is almost obsolete since perfecting the technic of laparotomy.

In intraabdominal correction also too much credit has been placed by operators on the teres shortening alone, as is testified to by the number of ingenious and one might add, ingenuous operations; to name which, much less to discuss, is not the province of this paper, while too little thought has been given to the often much more necessary and much more difficult shortening of the uterosacral ligaments.

Anterior fixation which in times past has so often been thoughtlessly performed, is (where there is an entire relaxation of the whole upper pelvic floor segment so common in old multiparæ) often the only effective operative procedure.

The anchored healthy uterus supports both the uterus and the floor and also aids in guiding intraabdominal pressure to the sides

of the pelvis where the fascial and muscular attachments are strongest.

The relative contraindication of a possible pregnancy later and the positive contraindication of carcinoma should always be borne in mind.

The removal of the entire healthy uterus before the menopause certainly removes the liability to pregnancy, but to support the pelvic floor it is usually still very necessary to do the less efficient anchoring up of the vagina for a purpose better served in the non-carcinomatous uterus by removal of the tubes only before the anterior fixation.

The omission to do the lower segment repair perineorrhaphy and anterior colporrhaphy (which the author admits are tedious and time consuming) at the same operation as the anterior fixation is for the reasons given above a reprehensible omission all too frequent if the essayist may judge from the cases coming to him almost daily still complaining of the marked discomforts of the un-repaired "celes" as well as the danger of dragging out the fixation tissues into dangerous bands.

ROOM 1421, PEOPLES' GAS BUILDING.

STERILITY, ITS CAUSES AND ITS TREATMENT WITH AN ORIGINAL STEM PESSARY.

BY

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(With two illustrations.)

A MARRIAGE is said to be sterile, if no children are born after three years of married life. The growing percentage of sterility, as is now found in men, tends to relieve much of the odium, borne for so long a time by the women, and suggests the use of the term sterile marriage rather than sterile woman. Sterility in men, as is now given is a much higher percentage than was formerly supposed, this change is due to the later studies in gonorrhea and syphilis in this regard. The causes of sterility may be divided into functional, structural and pathological. Of these causes we know least about those coming under the division of morbid physiology.

* Read before the Wayne Co. Med. Soc. Apr. 13.

It is to this variety that I wish to direct your attention more particularly, as the instrument which I will demonstrate to you is especially adapted for the treatment of such cases. The most frequent cause of sterility offering any hope of success is a stenosis of the cervix combined with some abnormality of the secretions, or it may lie in the interrelation of the ovulation and menstruation cycles.

We may also have, as causes of sterility, an abnormally long cervix or isthmus, a short vagina, an infantile uterus, abnormalities in positions of the uterus resulting in angulation of the cervical canal.

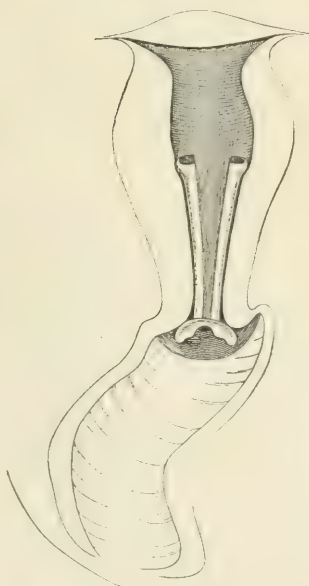


FIG. 1.—Showing relation of seminal pool to pessary and uterus.

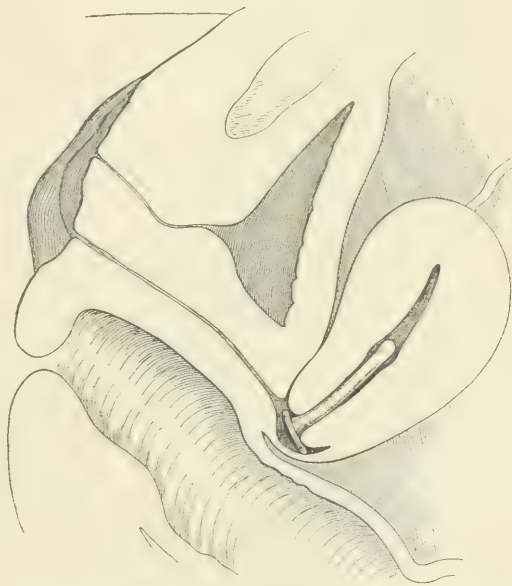


FIG. 2.—Showing relation of seminal pool to uterus and instrument.

The position of the uterus may prevent the cervix from being bathed in the seminal lake. This lake and its relations to the cervix are very important; it is normally of considerable size and so placed that it will hold the seminal fluid, not allowing it to pass outward, but will favor the spermatozoa in their efforts to gain entrance, in vast numbers, into the uterus. Embryologists teach us that the spermatozoa can travel by their own propelling force about their own length per second.

After watching them for a long time under the microscope it is easy to see that they travel in no definite direction, but by the aid

of their circular motion, tend to go in the path of least resistance. The slightest obstruction will stop them, when they may start off just as energetically in a useless direction. It is likely, however, that they are attracted by the normal alkalinity of the cervix and repelled by the acidity of the vagina (experiments will demonstrate this phenomena). They will live in the uterus and tubes for several weeks (in dead women for some time). The oviducts of married women are known to frequently contain large numbers of spermatozoa. In the bat the spermatozoa are deposited in the autumn and fecundate the ova the following spring. The ova of the woman, on the contrary, only maintain their vitality for a few days and are practically never found in the discharges. The spermatozoön must make its way against the flow of discharges from the uterus and the cilia in the uterus and tubes. These cilia propel the secretions and the ova downward and outward.

If these secretions are normal in amount, reaction, and consistency (the viscosity should be no greater than blood serum), the spermatozoa will likely pass through the cervix, but if the cervix is markedly acid or the discharge thick, entrance as far as the uterine opening of the tube may be inhibited. Experiments upon animals tend to prove that fertilization takes place in the lower third of the tube. (Hypodermic injection of spermatozoa into the abdomen of lower animals has partially demonstrated this point.)

The uterine entrance into the oviduct, at best very small, must be in a fairly normal condition for a sufficient number of spermatozoa to find this very small opening. It seems likely that in the majority of cases, for conception to occur many millions of spermatozoa must enter the tubes. Two hundred millions are said to be passed at a single ejaculation, but like other seeds or single-celled animals, countless numbers are lost.

The seminal lake may be improperly developed in size or it may be practically nonexistent due to causes of development, or displacement of the uterus or again it may be so damaged by a previous child birth as to be unable to retain the semen for any length of time.

The chemical reactions of the normal secretions in the birth canal are acid at the vulva (due to lactic acid), decreasing acidity toward the cervix and alkaline in the uterus. These differences are evidently an effort on the part of nature, to prevent the entrance of microorganisms into the uterus. When these secretions become abnormal they are likely to interfere with the passage of spermatozoa and to favor the growth and passage of the many varieties of bacteria found in the vagina. These secretions of the genital tract are capa-

ble of many abnormal changes, due to infection, inflammation, etc. The cervix may become so highly acid as to inhibit the spermatozoön, the viscosity so increased that a mucous plug is produced in the cervix or again the quantity of discharges so augmented as to prevent the upward passage of semen. Seminal fluid is alkaline and this reaction is normal for the spermatozoa. Spermatozoa will not always pass in where menstrual discharges can get out 'they are squeezed out, as it were' (Cary); nor does the passage of a sound through the inner os demonstrate that it is physiologically patulous, infinitesimal conditions often acting as a positive obstruction to the spermatozoön.

The effect of menstruation upon the reaction of the genital tract is to render it more alkaline, this being favorable to impregnation and also adds another reason for the seventeen to twenty-one days non-conception period. As is well known when the menses is small in amount pregnancy is less likely to occur, though there are striking exceptions to this general observation. One case is mentioned in the literature, of a woman who conceived after not menstruating for eleven years. I have known of two cases (mother and daughter) who only menstruated every three months, the daughter also having a child. It is considered the proper thing for Turkish women to become pregnant before they menstruate the first time. A decrease in menstrual flow is likely to result from a small uterus, the uterus of hyperinvolution, a lactation atrophic uterus or some damage to the glandular layer of the endometrium, from separation of a partially adherent placenta, etc. (Small areas of adherence are undoubtedly detached by Crede's method.) Damage to the placental site would not be unlikely to cause a one-child sterility as it is about this same area (upper and posterior wall of uterus) which should afford attachment to the next fecundated ova.

Ovarian function and metabolism have much to do with menstruation as is shown by the general relationship of the menstrual cycle to the ovulation cycle and it is my opinion that a lack of this proper relation is a frequent cause of sterility. One evidence of the passage of an ovule in the middle of the month is pain and an increased discharge at this time; menstrual molimina without blood. If for example, the ova is habitually given off at the wrong time of the menstrual cycle the decidua will not have been changed into the decidua of pregnancy (this change should occur while the fertilized ova is still in the tube) and the ova will be unable to attach itself by the process of erosion, which we now know occurs. (This erosion or burrowing into the superficial, deep layers and blood-ves-

sels of the uterus means that the mucous membrane must be in exactly the right state to admit of it.) In other words, the soil must be prepared before the seed is planted. Therefore, the ova may have been fertilized and reached one of the preliminary stages in the tube (mulberry mass, etc.). It may remain alive and unattached to the uterus for a short time, but in this now highly specialized cell, protection must be soon at hand or it will be swept from the uterus by the secretions or blood. It would seem likely from a survey of embryological facts that an accurate timing of these cycles is highly desirable as far as impregnation is concerned.

That conception does occur at about the same interrelation of these two cycles or when certain events in them correspond is highly probable, when we reflect upon the accuracy of the old rule of predicting labor (count back three months and add seven days). In this rule there is an admitted error of from two to four weeks, and yet how frequently this method gives us a nearly exact date of labor, what a small percentage of women go much over or under their expected time. There is something more than chance in these facts. At least one need not stretch his imagination very much to reason that a slight deviation between these two cycles would be a strong factor in producing sterility where no other cause could be found and that to institute a treatment to alter the relation of their events would be rational.

The ovary in the fetus undergoes a change in position similar to the descent of the testes, though not so marked, but if not complete their relationship to the tubes may be interfered with. The ovaries contain many ova (70,000) which are formed at the fetal stage of the baby or not later than the second year of life, some embryologists believe that sex is determined at the time the ova are formed. (The old embryologists maintained that Eve's ovaries contained two hundred million ova—the preformation theory.) However, there are many more ova in the ovary than are ever discharged; undoubtedly many are lost in the abdomen owing to the indifferent method of their passage into the tube. Among other factors a normal amount of abdominal fluid must be present and this it would seem could be affected by many intraabdominal conditions (intestinal inflammations, adhesions, blood and lymph supply, etc. There is said to be a current set up in this fluid by the cilia of the tube and the ova are swept by the current in this fluid, into the fibrilated extremity of the oviduct.

Other causes of sterility are, diseases of the endometrium resulting from sub- or hyperinvolution, secondarily from venous stasis, due to

displacements, lacerations of cervix, etc., and infections. Of the latter the different groups of the gonococcus (the gonococcus is no longer considered to be one organism but a group of organisms) produce different grades of morbidity in the uterus and tubes. That these various causes can do so by closing the uterine ostium of the oviduct and yet not always cause serious damage to the tube seems probable. Such a condition would be interesting in association with this pessary, as one can apply medication to the locality of these openings through it, or in favorable conditions inspections of them or their areas could be attempted, by passing an electric light through the instrument, it serving, for the time being, as an endoscope.

The eugenists tell us that 75 per cent. of men have gonorrhea before they are thirty (in other words it is more common than measles). They also tell us that 90 per cent. of blindness is due to this disease, so that it is rather difficult to figure out its relation to sterility. However, in examining, say 100 cases of this disease in women at the Crittenden Hospital over a period of two years or more, I was impressed with the small per cent. who became pregnant, although exposed.

A few words in relation to treatment, and this instrument. Dr. Carstens demonstrated to us years ago that a stem pessary when made of the proper material, used aseptically and in suitable cases, was very unlikely to do any harm. This seems quite reasonable when you remember the protecting secretions, their reactions and movements, and we must admit that in multipara the cervical canal is frequently patulous, though no harm results. This pessary is designed in an attempt to fulfill the following ideas: to hold open the internal and external os, to be grasped by the internal os and so kept in place, and yet not to impinge upon the true cavity of the uterus (where implantation occurs). Also to offer a very large and free opening into the body of the womb so that the spermatozoa may progress freely over mucous membrane alone, coming in contact with no foreign substance which might be inhibitory to them, the posterior wall of the cervix (where the spermatozoa normally pass) being free from the instrument and the *pleca palmata* being largely uncovered and able to perform their function. The part of the instrument against the end of the cervix is so thin and small as to be nearly impalpable and as far from the seminal lake as is possible. The instrument is made in different sizes as to length and diameter and is to be fitted to the uterus as indicated.

Alterations in the secretions of the cervix and uterus can be studied through it and the appropriate treatment used. Applications can

bemade to the mucous membrane of the body of the uterus, and it can be used as an endoscope which remains in position, if desired.

Electrical treatment, which now has recovered from the blow dealt it by the charlatans, can be carried out with ease and thoroughness to the uterine cavity and perhaps the nutrition of the ovaries and tubes affected in this manner.

Apostoli has reported eighty cases of sterility cured with the electrical current alone. The negative pole in the uterus will usually bring on menstruation ahead of time and thus is the ovulation cycle effected, or if desired the flow can be made more profuse by using the current just before an expected period. Many combinations with this method of treatment are possible. Cureting the uterus is frequently useful as a treatment for sterility or the dilation that accompanies it. However, it may be an added cause of sterility if the decidua is so damaged that it is not properly replaced. Cicatricial tissue may be formed, or in rare instances the cavity of the uterus obliterated.

Plastic operations to restore the pelvic diaphragm are very useful, the indications being to do away with the vaginal inclined plane looking downward, to restore the seminal lake (put lateral stitches in vaginal wall) and the normal H shape of the vaginal walls. Likewise to replace the uterus in its normal position, etc. Third- and some second-degree lacerations of the perineum must be repaired with the function of the seminal lake in mind and the stitches so placed.

The usefulness of ovarian extracts, corpus luteum, etc., are problematical though they seem to have a good effect.

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TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of May 6, 1915.

The President, DANIEL LONGAKER, M. D., in the Chair.

DR. T. W. BUSCHMANN (by invitation) presented a

REPORT OF CASES SHOWING DISPROPORTIONATE INVOLVEMENT OF THE TWO KIDNEYS IN THE TOXEMIA OF PREGNANCY.*

DR. BARTON COOKE HIRST.—This study of the kidneys separately in toxemia seems to be a new subject to most of us. Anyone charged with the care of such a patient would feel that she needed the interruption of gestation. A woman with dim vision, edema and all the urinary changes seen in this case would seem to be in imminent danger, unless her pregnancy were terminated. When the case was presented to the section of the fourth year class I said, undoubtedly this woman must be relieved by terminating pregnancy even though it involved the destruction of the fetus and I had set a day for the operation. Meanwhile Dr. Buschmann had made his examination with the cystoscope and by catheterizing the ureters and had reported the result. It never occurred to me that there might be a difference in the condition of the kidneys. It seemed to me in view of the normal condition of one kidney that we might well take a chance on a little delay and upon the continuance of treatment which otherwise I would not have considered justifiable. As Dr. Buschmann has shown the delay was justifiable. Our attention must be arrested by this report and in such cases in the future we must make a study of the condition of each kidney separately and not be content with the gross findings of the urine from the bladder. I hope that accumulated clinical experience will show that if we find one kidney good, delay in operation and the continuance of palliative treatment may give a fair chance of saving fetal life. In regard to the cystoscopy and catheterization of the ureters in this case: Dr. Buschmann has provided himself with the best type of German cystoscope which he finds very satisfactory. I have been accustomed to an American type of cystoscope and find myself more at home with the use of it, though I am obliged to confess that the German cystoscope has a better light and a better lens than the one I use. Feeling that we ought to be able to make as good an instrument in this country I asked the Wapplers to make an instrument

* See original article page 624.

with the mechanical arrangement of theirs preserved, which to my mind is better than the German's, but with a slightly larger caliber, a better light and lens than their previous model. I have received such an instrument and is well worthy the attention of those doing this kind of work. The light is quite equal to that of the German instrument and the lens has a field as large. As I have said, I like the mechanical arrangement better than that of the foreign-made instrument. It is well worth our while in connection with the study of the two kidneys separately to provide ourselves with implements which allow us to do this work in the best possible manner.

DR. PHILIP F. WILLIAMS.—Regarding the functionability of a single kidney throughout pregnancy, I recollect a case seen at the autopsy table at the Philadelphia Hospital of an aged colored woman who died with the usual senile changes frequently found there. The woman's left kidney was not larger than a hen's egg. The right kidney was of the normal size and weighed 125 grams. The woman's history showed that she had gone through several pregnancies and several miscarriages. From an examination of the left kidney at the time it seems that it must have been of this infantile type throughout the woman's entire life and that the one fully developed kidney had carried her satisfactorily through the different pregnancies which she had had. In another case of which I am cognizant the woman had had nephrectomy done on the right side for tuberculosis of the kidney, subsequently becoming pregnant. The pregnancy proceeded to full term without any untoward results.

Regarding the test of the functional ability of the kidney, I do not consider the phenolsulphonephthalein test reliable in this connection in pregnancy, normal or pathological. In forty cases of pregnancy, twenty of which were normal and twenty pathological, studied by Dr. Farr and myself there were some instances in which the excretion of urine from apparently normal kidneys was as low as 30 per cent. In some of the pathological pregnancies the excretion was higher than that given by Rowntree and Gerahty, which is considered to be the normal limit.

DR. STEPHEN E. TRACY.—I have been interested in the excellent report of the cases by Dr. Buschmann, but I cannot see what difference it will make in the treatment of cases of marked toxemia of pregnancy, whether both kidneys are functioning equally or whether one kidney is doing all the work. We all know that a patient after a nephrectomy may go through pregnancy and labor with absolutely no trouble. If the life of the patient is seriously endangered from the toxemia, she must be delivered and the pregnancy must be terminated no matter if 75 per cent. or 100 per cent. of the renal function is being done by one kidney. In regard to the phenolsulphonephthalein test I quite agree with the remarks of Dr. Williams. There is such a marked variation in the results that the test is not of great importance. The phenolsulphonephthalein test is given to practically all my operative cases; it is simply an extra safeguard to the patient, as a small

phthalein output causes us to study the case more carefully and to spend a few days more in the preparatory treatment.

DR. WILLIAM R. NICHOLSON.—I also am much interested in this report and from an experience very much less than that of Dr. Williams or Dr. Tracy in the use of the phenolsulphonephthalein test I have come to somewhat the same conclusion, that as an index of kidney efficiency in pregnancy it is not of great value. Of course, if it can be proven that we are wrong and that the deductions made by the reader of the paper are correct, it will be a very valuable thing to know indeed. But I must say that at the present time I feel rather skeptical whether I would want to base a very great deal upon the test mentioned. I think that if a woman presented the symptoms of profound intoxication I would still induce labor, even though I found that one kidney was practically normal in function while the other was diseased or less powerful in action.

THE PRESIDENT.—It seems to me that we have in this report a means of demonstrating that one of the kidneys is good and if the patient can hobble along with that one, it is something like a crutch to a man who has one good leg. I think the results demonstrate the practicability of the method and the justifiability of temporizing an expectant treatment in patients having one good uninvolved kidney.

DR. GEORGE VICTOR JANVIER.—Being only a junior member of the Obstetrical Society I feel some hesitancy in speaking. I am right from the country but am doing a little special obstetric work in our University Southeastern Dispensary outside service. Certain things have impressed me as showing what we are up against. I am struck with the fact that we so frequently see a pathological condition of the kidney in pregnancy in Italian women. I think it may be due to the peculiarly toxic food they eat. During the winter they have practically no fresh dietary such as greens or fruits. They make in the fall a dried-out pasty heavy tomato sauce which they use on their food all winter and which is full of germ life. They live on this horrible fresh heavy Italian bread, bologna sausage and frankfurters, all germ-laden dried meat. Why it does not cause more toxemia of pregnancy I do not know. I sent in the second case reported by Dr. Buschmann. You big men working in the city, with every facility and three or four assistants at hand, do not realize what we are up against in the country. It has been a very difficult problem sometimes to determine just what to do. You are considered an alarmist if you send a patient into the hospital and the case clears up and criticised if you do otherwise. They look for half a dozen convulsions in a patient before consenting to removal. I fought for two hours on Sunday morning before I could get permission to have this patient sent in. I think much good would be accomplished if the importance of the dietary could be emphasized to our foreign-born patients to the effect that particularly during the last three or four months there should be a plentiful supply of milk and green vegetables and less of this germ-laden protein food.

DR. BUSCHMANN, closing.—I agree perfectly with what Dr.

Nicholson and most of the other members think in regard to the idea of interrupting pregnancy when there is insufficient renal function as shown by any test. That which interested me chiefly in these three cases was the unilateral involvement, not that it was absolutely necessary to determine that the involvement was on one side, but to decide whether pregnancy should be interrupted. The method of taking the urine from each kidney separately is exceedingly valuable in determining the comparative involvement of the two kidneys.

DR. CHARLES O'REILLY (by invitation) read a paper on

FURTHER OBSERVATIONS ON THE INTRANASAL TREATMENT OF
DYSMENORRHEA (WITH REPORT OF CASES).*

DR. EDWARD A. SCHUMANN.—A relative of mine, a girl of nineteen, not at all neurasthenic suffered with such severe dysmenorrhea that she was obliged to keep her bed for the first day. The dysmenorrhea was regarded as being due to the antelexion of the uterus and stenosis of the cervix. She was visiting in my family and desiring to go out in the evening, was much chagrined to find herself disabled by dysmenorrhea. Rather jokingly, I instilled a 20 per cent. solution of cocain into both nostrils without special reference to the genital spots as I did not know where they were. The pain disappeared and she was able to go to a dance that night.

DR. WILLIAM R. NICHOLSON.—I am sure the gynecologists will welcome this "help from Macedonia," and if Dr. O'Reilly and his confrères can cure a certain percentage of these cases I am sure they will confer a great benefit. I should like to ask whether there has been any differentiation between the various kinds of dysmenorrhea in their relation to this method; whether the dysmenorrhea of antelexion, which I understood was the cause in Dr. Schumann's case, is more likely to be relieved than the ovarian type?

A second question I had in mind was regarding the permanency of the cure. That makes, of course, little difference, for if for six months the symptoms were relieved, the method could be repeated.

In the third place I should like to ask whether there must be a pathological condition of the nose to make the treatment valuable, or whether there need be simply a normal nose to which the application can be made with relief of the dysmenorrhea.

DR. GEORGE ERETY SHOEMAKER.—The idea that there is a genital spot in the nose which treated will relieve dysmenorrhea was suggested a good many years ago and I would ask whether there is any explanation of the fact that the method apparently is not now more widely used.

DR. O'REILLY, closing.—Replying to the question of the condition of the uterus causing the dysmenorrhea, my experience is that the cause had no influence upon the treatment. It is entirely a nerve condition treated. The genital spots are in the anterior portion of

* See original article page 634.

the inferior turbinate and tuberculum septi: and are connected with the nerve supply of the uterus and adnexa. We are treating only the pain irrespective of the condition. We do not propose to cure antelexion by treating the spots in the nose, but we can cure the pain arising from that condition.

DR. WILLIAM R. NICHOLSON.—I did not suppose you would attempt the cure of uterine disease. What I mean was whether the true ovarian dysmenorrhea, that which we classify as ovarian, would be influenced so satisfactorily as the dysmenorrhea you speak of as due to antelexion.

DR. O'REILLY (replying to Dr. Nicholson).—The pain would be influenced. Regarding pathological conditions of the nose, I said in my paper that a deflected septum, an enchondrosis or an affected middle turbinate should be corrected first before applying trichloroacetic acid to genital spots, because they may themselves influence the nerve tract which connects the nerves of the nose and of the uterus and adnexa.

Replying to Dr. Shoemaker, this treatment was first brought to the attention of rhinologists in 1894 by Fliess, but for some unknown reason, was not extensively used probably owing to the lack of material. Emil Mayer and Brettauer reported last year before the New York Academy of Medicine and before the American Academy of Ophthalmology and Oto-laryngology ninety-three cases which Brettauer had referred to Mayer. It is not a cure-all, but in the great majority of cases, with the proper application it is effective. These are not theoretical spots at all, but they can be plainly seen. In the great majority of cases you will either get great relief or an absolute cure.

DR. DANIEL LONGAKER.—It might not be entirely inappropriate for the Chair to state that the late Dr. Harrison Allen pointed out this peculiar association to Dr. Charles P. Noble on one occasion.

DR. JOHN N. GIRVIN read a paper on

THE AFTER-RESULTS OF CURETMENT OF THE UTERUS.*

DR. GEO. E. SHOEMAKER presented a

REPORT OF CASES ILLUSTRATING THREE TYPES OF ECTOPIC GESTATION.

I. EXTRATUBAL OR ABDOMINAL PREGNANCY AT THE FOURTH MONTH.

L. G., a strong well-nourished woman of thirty-eight years, white; para-ii, the younger child thirteen years old. Previous history negative. Menstruation last seen just four months before coming under observation, though a little irregular bleeding occurred for ten days about two months later. Pain at intervals for four weeks, in right abdomen, twice severe paroxysms requiring morphia hypodermically. There was no anemia. White blood count 9550. Nausea of

* See original article page 632.

pregnancy absent, though present with other children. Breasts negative, no brown discharge. However, the cervix was very soft and there was passive vaginal congestion. The uterus was deviated to the left and in front of a cystic or semisolid mass on the right, an obscure sulcus lying between. Her physician, Dr. H. L. Harvey, of Pleasantville, N. J., had suspected extrauterine pregnancy. Our diagnosis coincided as to probable unruptured extrauterine pregnancy at the fourth month, though incarcerated uterine pregnancy was not entirely excluded.

Operation.—No free blood. No parietal adhesions. A few drams of bloody serum. The right tube, ovary, broad ligament and gestation sac were closely incorporated, but were shelled up from below and turned forward and outward by the hand, much as a slightly adherent ovarian cyst might have been. The gestation sac were covered behind only by the transparent amnion through which the child could be seen. The broad ligament, covered by greatly distended veins curved over its anterior surface as it usually does over any tuboovarian sac. Curiously there was little bleeding and there was no difficulty in tying off a rather short and broad pedicle in sections with catgut. The amniotic sac was intact over the child when removed but was unfortunately torn by handling afterward. The child was flexed as *in utero*. In the specimen the tube with its fimbriæ may be seen passing along the outside of the sac.

The child was doubtless alive up to the time of removal, though a small clot the size of a walnut within the mass, indicated that rupture was impending as was likely from the recurrent pains. Doubtless this is an early abdominal pregnancy. The entire gestation sac has gently escaped from the tube without hemorrhage and the vascular supply has continued through vessels of the ovary and broad ligament. No intestinal or parietal attachments existed making it possible to tie off completely. There was no drainage.

The patient made an aseptic recovery and was discharged well.

2. ATTEMPTED CRIMINAL ABORTION IN RUPTURED INCARCERATED ECTOPIC GESTATION.

This patient, F. H., thirty-eight years, para-i, was supposed to be living a single life and would admit nothing in the way of symptoms of pregnancy, the statements being contradictory. She was admitted to the ward on a complaint of bleeding for three weeks, the discharge being brown and constant, with severe pain in the right abdomen for one week in paroxysms; a little nausea; no faintness; some perspiration. The worst pain was said to have been two days before admission. She admitted no alteration in menstruation except that the previous period might have been shorter than usual. It was later reported by telephone that an unknown woman had introduced a catheter with a wire in it into her uterus some eight days before admission to the hospital.

The pulse was 120, temperature 99.5, white blood count 11,500, Hemoglobin. 74. per cent.

Examination.—Breasts suspicious, passive congestion of vagina, dark brown bloody oozing, the cervix a little soft. A mass resembling fixed clot in consistence, lay to the right and behind the empty uterus, the mass being of the size of an orange.

Operation was advised on the probable diagnosis of extrauterine pregnancy, in spite of the rumor of attempted artificial abortion. On section, no free blood in general peritoneal cavity but a little dark serum. A mass of old clot was covered in or incarcerated in the pelvis by the small bowel being adherent to the bladder. The right tube was distended by and surrounded by clot. It was tied off and removed with the ovary. Left tube normal, left ovary contained a small hematogenous cyst which was resected. The left tube and ovary and appendix were not removed. A hematocele behind the peritoneum of the left pelvis was probably due to attempts at abortion. As there was no fresh bleeding this was not disturbed. The abdomen was closed without drainage. The patient fortunately made an excellent recovery, escaping infection entirely. Pathological laboratory report on Fallopian tube: fetal elements and blood clot.

3. UNRUPTURED TUBAL PREGNANCY IN EARLY WEEKS.

Mrs. M. K., twenty-six years, para-ii. This specimen is presented intact. The diagnosis was not made and the operation was undertaken because of chronic conditions. There was severe disability from retroversion and descent of the uterus, with laceration of perineum and relaxation of pelvic support. Someone else had removed the appendix and right ovary months before, without relief. The enlargement formed by the combined prolapsed ovary and tube was noted before operation, but the significance was not recognized. Menstruation was of regular type, four weeks, seven days, two napkins a day. Pain decided. No period had been missed. The last one should have ended eighteen days before admission, but after the flow stopped for one day, a *brown bloody discharge* began and had continued constantly ever since with the exception of two days. There was pain in the left abdomen and dizziness.

Operation.—Combined local and general anesthesia. There was nothing in the uterus to account for bleeding. The cervix, perineum and anterior wall were repaired. On opening the abdomen the left tube was adherent slightly to the ovary and presented a smooth fusiform bluish swelling or sac, midway of its slender length. The proximal portion of the tube 2 inches long was normal and was not removed. The fusiform swelling which resembled an unruptured gestation sac was tied off and removed. The outer end of the tube was again normal in size and soft, the fimbriæ were slightly adherent but not diseased. The sacculation must be considered in connection with the prolonged escape of brown discharge. The specimen is in the hands of the Wistar Institute of Anatomy for study.

The operation was completed by round-ligament suspension

of the uterus, suturing the ligaments to the posterior uterine wall and fastening the prolapsing ovary near the uterine cornu. Aseptic recovery.

These patients were all in the hospital at the same time. Two of them presented the significant symptom of continuing brown discharge. They illustrate once more the variety of conditions met with in connection with this disorder.

DISCUSSION

DR. STEPHEN E. TRACY.—The important thing in extrauterine gestation is the diagnosis. In a large percentage of the cases, probably from 90 to 95 per cent., the diagnosis can be made from the history, if a careful history be taken. The ideal time to get these cases is before rupture takes place, but unfortunately the surgeon seldom sees a case at this stage. Operation before rupture is a simple procedure. Cases in which rupture has occurred or tubal-abortion has taken place, the diagnosis again is important. When I see a case which has been diagnosed as an incomplete abortion, unless the doctor has really seen some of the product of conception, my first thought is to determine whether or not the patient has an abortion or an unrecognized ectopic gestation. I have had a number of cases admitted to my hospital service as incomplete abortion, and some have even been curetted, in which an ectopic gestation was the cause of the irregular and persistent bleeding. The third class of cases, those in which the product of conception escapes from the tube, becomes attached, and continues to develop, are at times extremely serious from the standpoint of the surgeon on account of the severe, and at times, uncontrollable hemorrhage. Unless one is certain of being able to control the hemorrhage, it is much safer to suture the sack to the incision and pack with gauze. Dr. Shoemaker is to be congratulated on being able to do the complete operation. Some years ago, I had a case which had developed five months and was complicated by fibromyomata uteri, densely adherent in the pelvis. In this case, hemorrhage was appalling but was finally controlled, and the entire product of conception and the fibroids were removed.

DR. E. A. SCHUMANN.—I must take issue with Dr. Tracy in his statement that the diagnosis of extrauterine pregnancy is easy. Looking back over some years experience in hospital and private work I find that the differential diagnosis between extrauterine pregnancy and partial abortion has been one of the most difficult to me. Even with the carefully taken history mentioned by Dr. Tracy, what do we learn? The woman has missed a period, has cramp-like pain, and irregular hemorrhage, is it an extrauterine pregnancy, or early abortion? Examination reveals a little mass in one or the other ovarian regions. Does that mean adhesions about the ovary, or extrauterine pregnancy? Personally, the diagnosis of early extrauterine pregnancy (between the third and fifth week of gestation) has always been to me, and I had always considered it from the literature, one of the difficulties in gynecological practice.

DR. MERCER.—The paper recalls to me that about ten years ago a woman came to me pregnant about five months. There was no particular history. At about the time I figured out the pregnancy was at term she was taken about six o'clock in the morning with a peculiar pain in the abdomen. She came into the hospital. We could not recognize any uterine movements, but there was this peculiar pain and tense abdominal muscles. In twenty-four hours apparently no progress had been made. We could make out the back of the fetus and one side extremities. Morphine was given to obtain rest. I consulted two other men and suggested the possibility of an abdominal pregnancy, but this was not accepted. In another twenty-four hours it was determined that there was a full-term abdominal pregnancy. The patient died. A large placenta reached almost to the kidney. As well as I could tell the tube was entirely intact. The lesson I received from this was that in a case suggesting abortion I think first of ectopic pregnancy.

THE PRESIDENT.—In this connection the Chair would like to call attention to a case which occurred some twenty years ago. The patient was in the care of the late Dr. James Collins and Dr. Mordecai Price. She went to term with an abdominal pregnancy. The baby was delivered alive and the mother made a good though slow recovery. An abdominal incision was made and the placenta left, coming away some months afterward and the sinus finally healing up.

DR. SHOEMAKER, closing.—The diagnosis of early unruptured extrauterine pregnancy is perhaps not very difficult in the typical case. But we see, as this case illustrates to-night, a great many atypical cases and quite a number in which there has been some interference. I have made the diagnosis before rupture several times and have operated upon these cases.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY.

*Fortieth Annual Meeting, Held at White Sulphur Springs, West
Virginia, May 18, 19 and 20, 1915.*

The President, THOMAS J. WATKINS, M. D., Chicago, in the Chair.

(Continued from July number.)

A PRECISE METHOD OF CHOOSING A SAFE TIME FOR OPERATION IN PELVIC INFLAMMATION OF TUBAL ORIGIN.

DR. F. F. SIMPSON, of Pittsburg, pointed out that the object of his paper was to indicate how the time for maximum safety of operation might be chosen by gynecologists; to point out easily defective physical conditions which inevitably caused disaster when disregarded, and to show that the consensus of opinion of competent

gynecologists was in strict accord regarding the principles involving the treatment of pelvic infection of tubal origin. Of course, it was understood that elective operations were not to be countenanced in the presence of grave cardiac, renal, pulmonary, thyroid and other affections, unless and until those diseases had recovered to the extent that they no longer increased the hazard of anesthesia and operation. Even then the need must be urgent and the procedure simple.

It was an axiom of pelvic and abdominal surgery that in competent hands, almost all infections formerly thought to imperatively demand surgical intervention, even at the height of the disease, could be easily and safely converted into conditions suitable for elective work. Practically the only exceptions to this rule were traumatic injuries, intestinal obstruction, perforative lesions of hollow viscera, and some cases of appendicitis and of tubal pregnancy.

The crystallization of the writer's ideas on this subject was gradually brought about by a critical study of a considerable series of cases (some thousands) of pelvic inflammation and had been fully confirmed by a series of 856 consecutive abdominal operations done to provide relief from the results of tubal infection, with only nine deaths, a mortality of a little more than 1 per cent. The writer believed that such a death rate in such a series of operations for pelvic inflammation occurring chiefly among the charity patients of a general hospital in a large city, was sufficient evidence that principles which admitted of such a death rate under such circumstances must have at least a degree of merit. A critical analysis of those cases in which convalescence was normal, of those seriously ill, and of the fatal cases strongly confirmed the fact that strict adherence to those principles should result in a still further reduction in death rate.

In the writer's judgment the questions of mortality, of post-operative morbidity, and of the smoothness of convalescence depended almost entirely, in competent hands, upon a strict adherence to the following postulates:

1. The patient shall have recovered from her acute illness and shall have regained a satisfactory margin of reserved strength.
2. The temperature shall not have risen above normal a single time for a minimum period of three weeks.
3. There shall have been no marked or persistent rise of temperature following a careful bimanual examination.
4. The inflammatory exudate surrounding the focus of infection shall have been completely absorbed.

No one of sound judgment would think of choosing as subjects for elective operations, patients acutely ill from pneumonia, typhoid fever, scarlet fever, etc. The same principle applied to those suffering from the effects of bacterial poisonings generated in the pelvic structures. As pelvic infection of tubal origin rarely killed, most operations for their relief should be done only at the quiescent or elective period.

The temperature shall not have risen above the normal a single time for a minimum period of three weeks. This was an empirical

rule based upon the belief that it frequently required a minimum period of three weeks of absolutely normal temperature for Nature to destroy all bacteria and to restore the affected tissues to their normal. All operators of experience knew the serious technical difficulty which confronted them when intestinal walls and other structures were still infiltrated and friable—stitches tore out, raw surfaces could not be folded in, peritoneum could not be glided over denuded areas, and serous and bloody oozing from infective surfaces tempted one to use drainage and invited adhesions, intestinal obstruction, fecal fistula, hernia, etc.

It was evident that the exudate surrounding the focus of infection indicated Nature's effort to localize that infection by choking the afferent lymphatics for the purpose of hermetically enclosing the invading bacteria. So long as an exudate remained it contained living bacteria; and conversely, as soon as the bacteria were dead, or evacuated, Nature no longer needed the protecting exudate and it was promptly absorbed.

It was true that careful training and wide experience were required in order to detect the exudate and to interpret it properly in very many instances; yet that very training and experience constituted the barest but absolute requisites for the safety of the patient.

An analysis of the first 456 of his series of 856 consecutive abdominal sections was made in a paper read at the meeting of the Society in 1905. A study of the records of 400 additional abdominal sections done in part or in whole on account of inflamed tubes showed that there had never been an exudate, or that the exudate had been completely absorbed 340 times with only one death and without postoperative complications as consequences. An exudate of variable extent was present at the time of operation in sixty cases. In forty-four instances it was slight. In this series there were two deaths and twenty others had a stormy convalescence. In the remaining sixteen cases, there was a marked exudate. Two of these patients died. The remaining fourteen were seriously ill after operation. In other words, where the exudate was marked at the time of operation, the death rate was 12.5 per cent. Where the exudate was slight, the death rate was 4.6 per cent. Where there was no exudate the death rate was less than a third of 1 per cent.

It was evident that in the series of cases analyzed a more rigid adherence to the four postulates given would have resulted in a material reduction in the death rate. It was clear, therefore, that the only safe time to operate was when the patient had a fair margin of reserved strength, when she was not acutely ill, and when absolutely no inflammatory exudate would be opened into the free abdominal cavity.

DISCUSSION.

DR. JOSEPH BRETTAUER, of New York City, expressed his pleasure in listening to Dr. Simpson's paper. He fully endorsed it, and

said he had never done anything else but follow the practice in the three conditions mentioned. Not only was the death rate minimized by so doing, but the number of patients was decreased where it was necessary to do an operation. Many of these patients did not need an operation in the case of purulent collection of pus in the tube or in abscess formation. The pathological and anatomical end result was a tuboovarian cyst which, in a great many instances, never required operation because there were no symptoms and it was detected often by mere accident.

DR. JOHN O. POLAK, of Brooklyn, said he had been working along those lines which the essayist had called attention to in the matter of exudates for a number of years, and that everything the essayist had said he had proved time and again by exploratory laparotomy months and even years after to see what Nature's possibilities were in the way of reconstruction and conservatism. He applied this plan eight or nine years ago and followed it to the degree of overconservatism, but he thought he had saved hundreds of organs. He had been surprised in opening these cases to find how perfectly the pelvic structures had regenerated, not only as regards the functional ability, but as to the actual possibilities. For instance, he had seen cases after three or four years absolutely clear up and pregnancy take place after mixed infection.

DR. THOMAS J. WATKINS, of Chicago, agreed with the essayist, with the possible exception that sometimes it seemed of value to operate very soon after these patients had acquired a complete immunity to the infection, taking the temperature and the white count with the idea that there would be some advantage in operating before the adhesions became thoroughly organized. He had made some observations on this and it was quite sane to conclude that the increased amount of raw surface resulting from operating as soon as immunity had occurred was so much greater than the raw surface which remained after operating after the adhesions had become somewhat organized so as to make the advantage in favor of the later operation. Again, the number of adhesions encountered in operating at an earlier period was undoubtedly greater, many of them being absorbed more readily than they were during a later period.

DR. DOUGAL BISSEL, of New York City, said he was in perfect accord with everything contained in the paper and his conclusions regarding this subject dated back several years, the result of an unhappy experience in the Woman's Hospital when he was an intern there. The mortality from persistent operations upon cases of acute pyosalpinx and pelvic inflammations was very high, and with increased experience he refused to operate on these cases, and by following that practice his mortality had been very low ever since. He had adopted a plan similar to the one described by the essayist, but he had never put it in print. However, he was glad the essayist had done so and had done it so well.

DR. J. WESLEY BOVÉE, of Washington, D. C., stated that about ten years ago Dr. Simpson told him of his plan, and he adopted it,

and in conjunction with the leukocyte count he had followed it very thoroughly with the exception of two classes of cases. In the tubercular cases he would operate at once. In these one could hardly expect Nature to bring about a successful cure. In the other class he had markedly gone afield, and this was the acute gonorrheal case. He was not yet ready to report on his work in this regard. He had not seen the abdominal conditions after this procedure, but he had sterilized the vagina and vulva with iodine as well as the interior of the uterus by injecting the vagina and Fallopian tubes, opening the abdomen, separating adhesions, painting all raw surfaces thoroughly, but not normal peritoneum, with iodine, putting in drains up through the culdesac before he opened the abdomen, and then draining through the culdesac of Douglas, and had been pleased with the results. He had done this in the acute cases with a temperature of 103.6° . For the cases that were more subacute and with lower temperature he did not think the plan was feasible.

DR. PHILANDER A. HARRIS, of Paterson, New Jersey, stated that the essayist had distinctly pointed out that if we inflicted a certain amount of trauma we would get a certain reaction. The essayist had advised taking the temperature frequently and continually. To avoid confusion, he had also advised waiting until the different criteria, such as temperature and pulse and tenderness, had come to the health line, and then it was time to make the test. Dr. Simpson had added to the criteria which one might employ to help him to a safe operation, but he had not taken the time to tell about the morbidity, about intestinal fistula, nor had he referred to the lack of integrity of the abdominal incision and many other things which should be added to the misfortunes of an operation.

DR. H. S. CROSSEN, said that going back to two propositions we could often determine a gonorrheal infection, and it was safe to operate within three months afterward or two months after sterilization. If it was a streptococcic infection, it was never safe. He appreciated the fact that streptococcic masses were in many instances found self-sterilized. On the other hand, there had been other cases reported in which the infection had lasted as long as six or even twelve years. How were we going to tell? It was necessary to tell before operation. It did not do any good to determine it after operation. He had depended upon two things, the location of the lesion and the history of the case. He had not time to go into this in a thorough way except to say that, as a rule, by careful study of the history one could determine whether or not it was gonorrheal. By an examination at the time one could say whether it was tubal or parametric. It was known that the gonorrheal mass was always tubal. The gonorrheal and streptococcic masses, these two groups were so distinct that they could be attacked in a direct way. Putting these two things together, particularly where the location and history pointed to gonorrhea, it was safe to operate any time after the first three months. In certain cases we could not wait that long. If the trouble was of streptococcic origin, he thought it was never safe to do an abdominal operation.

DR. SIMPSON, in closing the discussion, said, with regard to the bacteriology of inflammatory exudates or of inflammatory lesions, that Wertheim a few years ago reported a series of twenty-five acute inflammatory specimens removed during the acute process or immediately after the temperature went down to normal, with approximately 70 per cent. of bacteria cultivated. In a series of forty cases, after time had been given for sterilization, 5 per cent. showed cultures, and no bacteria in the smears.

He agreed with Dr. Bovée that there were many instances in which it was not only possible, but advisable to open abscesses through the culdesac of Douglas, and also to open them through the abdominal wall.

SOME POINTS IN THE DIAGNOSIS OF ECTOPIC GESTATION.

DR. GEORGE TUCKER HARRISON, of Charlottesville, Virginia, stated that the diagnosis of ectopic gestation often presented few difficulties, but at other times there was no problem in the whole range of gynecological diagnosis so difficult as the establishment of this pathological condition. One error of diagnosis must be carefully guarded against, and that was to assume that the case which was the object of investigation was one of hematocele, when as a matter of fact it was a tubal pregnancy, located in Douglas' culdesac. Such a case he reported some years ago and it was quoted by Werth. This author had a similar experience and committed the same error of diagnosis. The deep situation of the fetal sac in Douglas' culdesac, and the rough uneven surface above simulated the characteristic phenomena of an accumulation of blood in the posterior pelvic cavity, as in the author's case. Before he saw her she had suffered from a chill, followed by fever. When she came under his care, the temperature was 105° F. His diagnosis was hematocele which had become infected. A posterior colpotomy was performed, and to his surprise, on entering the cavity with the finger, a fetus of four months was discovered. Fearing a fatal hemorrhage, the placenta was not removed, but treated by continuous irrigation. The patient made a good recovery ultimately. In Werth's case the placenta was removed, and the patient was only saved from a fatal hemorrhage by packing the sac with a tight tampon.

To mistake a uterine pregnancy with the uterus in a position of lateral flexion for a tubal pregnancy would seem to be utterly unjustified, and yet such mistakes had been made by competent men.

Several years ago a woman was under his care, and a thorough bimanual palpation convinced him that he had a tubal pregnancy to deal with. He operated on this patient, and when the abdominal cavity was exposed it was found that it was a case of uterine pregnancy. The patient suffered no ill consequences from the exploration, but went to full term and was delivered of a healthy child.

Twenty-six cases were reported in the literature in which laparotomy was performed in cases of uterine pregnancy on the ground of the assumption of ectopic gestation. In a number of these abortion followed.

Interstitial tubal pregnancy was especially difficult to diagnose. Fortunately it was of very rare occurrence. The author's experience in ectopic pregnancy has been very large, but he had never seen such a case. From its relations to the uterus, it was usually considered as a myoma, the error being due to the fact that it was much harder to feel than was usual. As an additional aid to diagnosis, the Abderhalden reaction might be employed.

As to the differential diagnosis, one or two points should not be left out of mind. In pregnancy in the tube primary adhesions to the posterior pelvic peritoneum existed or developed in the course of the first month of pregnancy. In consequence of this fact a large proportion of the gestation sac in many cases was permanently retained in the pelvis, while the pregnancy went on in its development. Another circumstance which might be occasionally utilized in the differential diagnosis lay in the inconsistency between the size of the gestation sac situated in the posterior pelvic space, and the period of pregnancy according to the count of the patient. In all these cases an erroneous diagnosis might jeopardize the life of the patient because the treatment indicated in the incarceration of a retroflexed pregnant uterus almost, as a matter of necessity, would call forth rupture with fatal consequences, if attempted in a case of a gestation sac the site of which was retrouterine.

DISCUSSION.

DR. ARTHUR H. CURTIS, of Chicago, said that in the diagnosis of tubal pregnancy, also in certain instances of uterine pregnancy, in which it was difficult to ascertain the exact condition, he wanted to mention the possible enlargement of one ovary. This was due to the presence of a corpus luteum. The enlargement of the ovary due to the presence of a corpus luteum in the case of tubal pregnancy was no greater oftentimes than was that in association with normal menstruation, but it was great enough so that the ovary was noticeably enlarged, and felt about the size of double that of the normal ovary.

DR. WALTER P. MANTON, of Detroit, said there were two don't's he would like to add to the diagnosis of ectopic gestation. The first don't was, "Don't put faith in a handsome widow." He recalled a widow who gave a history of having taken a ride of something like a hundred miles in the country. She had a chill on returning home and when he saw her was a very sick woman. There was a mass in the posterior culdesac; she had some pelvic pain, a slight rise of temperature, and he thought she had probably taken cold for some reason or other. She had a pelvic exudate. He put her on treatment, which was carried out by her physician, and in the course of a few weeks as she did not improve, he saw her again, and on account of some condition—he had forgotten now what it was—he decided upon curetment of the uterus. This might have been a mistake in a pelvic exudate. The scrapings were sent to a pathologist and here came in the second don't. Don't put your faith in the report of the

pathologist. The report came back that the scrapings consisted of large deciduous cells, and that the condition was probably deciduoma malignum. He told the patient firmly that under the circumstances the uterus would have to be removed. Before doing that the family wanted a consultant to see her. The consultant examined the patient and made a diagnosis of ectopic gestation, but when the speaker showed him the report of the pathologist he changed his diagnosis to that of deciduoma malignum. Dr. Manton operated on the patient. Fortunately, as soon as he entered the peritoneal cavity out came a lot of blood and a two months' fetus.

DR. PHILANDER A. HARRIS, of Paterson, New Jersey, stated that one should not place too much confidence in or reliance on a physical examination of the pelvis in any stage of pelvic congestion, because he did not know of any pathological condition in which one would find a greater variety of symptoms existing, owing to the fact that when one had ectopic gestation to deal with it was likely to present varied conditions and symptoms in different patients, so that he had come to think that the thing which we should do was to get at the primary history. This was very essential. One needed the initial symptoms of ectopic gestation to diagnose the condition. His experience was based on a large number of operations in which this condition was present, and from it he did not think any man could make a positive diagnosis of ectopic gestation in more than 85 or 90 per cent. of the cases.

DR. HERMAN J. BOLDT, of New York City, said that a correct diagnosis of ectopic gestation was by no means always easy. A condition that gave most trouble and which made the differential diagnosis difficult was a virulent inflammation of the adnexa. He did not know of any condition, both so far as the history and objective symptoms were concerned, which was so likely to lead to a mistaken diagnosis as that.

TYPES OF CARCINOMA OF THE UTERUS.*

DR. LAWRENCE W. STRONG, of New York City (by invitation), presented a paper on this subject, which was illustrated by numerous slides.

DISCUSSION.

DR. JOHN G. CLARK, of Philadelphia, said that as one realized the enormous changes the endometrium underwent during the twenty-eight cyclic days, the variations were so extreme and so closely simulated in many instances pathological processes, that the mere question of a hasty diagnosis while the patient was on the table by means of a frozen section was a hazardous one, and he thought would do much more harm than good. Therefore, the excellent and beautifully depicted paper, showing very conclusively the importance of not relying too much on the frozen section, was of great value.

* For original article see p. 431.

DR. FREDERICK J. TAUSSIG, of St. Louis, Missouri, called attention to the great difference between the multiparous and nulliparous woman. As he recalled an article published in a German journal a year or two ago, there were a large number of cases collected. The material was obtained from nine or ten clinics, and the number of cases tabulated was over 2000. It was the most complete tabulation he had seen on the subject, and demonstrated to his mind very positively that there was a relationship between multiparity and carcinomas; that the multiparous woman, even when we took only cases at the menopause, was more susceptible to this disease in a large percentage of cases.

In the cases at the Barnard Cancer Hospital in St. Louis in ten years they had had 150 cases of cancer of the female genital tract. Of that very large percentage fully three-fourths or four-fifths of the cases were invariably late cancers. They did not find more than two or three cases in which the tumor lay primarily in the corpus or body of the uterus. They had had cancers of the cervix which had gradually extended up into the fundus—quite a series of cases, but of those that started in the fundus and made a large tumor and broke into the peritoneal cavity, they had had not more than two or three.

DR. HERMAN J. BOLDT, of New York City, said that the unreliability of frozen sections was brought home to him by a well-illustrated example three or four years ago when he suspected the presence of carcinoma. He sent a piece of the tissue to the laboratory and waited for the report at the time of the operation. The report of the laboratory came back to the effect that he had a benign condition to deal with, and the result was he did not do anything except the plastic work which was necessary. A week or ten days later the laboratory sent back a report with an apology for having made an error in diagnosis, but based on the fact of the frozen section, and that it was not reliable. The condition was malignant and he had to do a more difficult operation than if he had done it immediately.

As to the cure of carcinoma by cureting, we must admit that occasionally it held true in the extremely early stage of the disease, particularly of the collum type, and also in very early adenocarcinoma of the body, but it must be very early.

DR. STRONG, in closing the discussion, said, in reply to Dr. Taussig, that his feeling was that the smallest area involved in the very early carcinoma of the cervix would allow of small excision without much danger of implantation. In advanced cases it would be quite obvious that carcinoma was present. It was only in the minute cases where that preliminary excision of a piece of tissue was called for, and the condition was different from the breast, because in the breast the nodule was deep and might not be accessible to excision, and frozen sections were of some value, but even there he should hesitate about putting too much confidence in frozen sections. He was glad to find that his position in regard to frozen sections was sustained by both Dr. Boldt and Dr. Clark.

PRESIDENT'S ADDRESS: WHAT HAS THE AMERICAN GYNECOLOGICAL SOCIETY DONE FOR GYNECOLOGY?

The President, DR. THOMAS J. WATKINS, of Chicago, stated that 683 papers had been presented upon gynecological subjects, not including ectopic pregnancy, by 190 authors in the thirty-nine volumes of transactions of the Society. Dr. Thomas Addis Emmet gave a Presidential Address, contributed eleven papers, and took an active part in discussions throughout the early history of the Society. His chief contributions were upon uterine displacements, vesicovaginal fistula, perineorrhaphy, and trachelorrhaphy. His first paper upon uterine displacement contained a statistical study of 2447 cases. The clinical histories which he kept and the observations which he recorded to obtain the information contained in this paper would even now be models for imitation. The value of this work as an incentive to others to do accurate, scientific clinical work, was beyond estimation.

The observations and deductions of Emmet given in his paper on the "Etiology of Vesicovaginal Fistula" settled for all time that the obstetric forceps was not the cause of fistulæ; that fistulæ usually resulted from neglected impaction of the fetal head in the pelvis.

The most classical paper of the thirty-nine volumes of the transactions was contributed by Emil Noeggerath in 1876. Justice could be done this marvelous paper only by quoting it almost in its entirety, as nearly all of it had stood the test of time and it contained little that could be eliminated. Very little had been added to what Noeggerath gave in this paper on the "Etiology and Macroscopic Pathology of Gonorrhea." The discovery of the gonococcus by Neisser made it possible for Noeggerath's followers to finally appreciate and assimilate his teachings.

Creditable papers had been presented upon the anatomy of the pelvic floor, the anatomy and development of the hymen, and upon the anatomy and physiology of the ovary. The contributions upon the corpus luteum had added to our knowledge of the menstrual disturbances.

Nineteen papers had been contributed upon cystocele and four upon urethrocele. Numerous operations had been advocated for repair of cystocele, notably elytrorrhaphies, anterior vaginal fixation of the uterus, fixation of the round ligaments, the Goffe operation, interposition of the uterus, and suspension and fixation operations by abdominal section. Shortening of the uterosacral ligaments had also received much attention with the above-mentioned operation. The relative value of these procedures had not been entirely determined. Their merit at present seemed to be largely a question of individuality of the case and the experience of the operator.

Four papers dealt with urethrocele and indicated that it was best treated by restoration of the urethra to its normal location and fixation by lateral sutures to fixed tissue, or by fixation in conjunction with some of the cystocele operations.

Seven creditable papers had been presented upon inversion of the

uterus. An original contribution given in 1899, which consisted in posterior vaginal incision of the constricting ring, was deserving of special mention. This operation had been improved by anterior vaginal incision of the constricting ring.

The transactions contained fifty-one papers upon uterine fibromata. The large number of papers upon this subject was a natural sequence of the great advance that had recently been made in the treatment of uterine fibroids.

Thirty papers were upon cancer of the uterus. Forty-two papers had been contributed upon ovarian and other pelvic tumors. It was interesting to note that seventy-six papers appeared upon medical gynecology.

In reviewing the work he had appreciated the danger of criticism in giving individual credits to men still active in the work. It was impossible to give all the credit which they deserved. Although the transactions often showed the need for work that could only be done in large clinics with adequate financial support, the thirty-nine volumes were valuable contributions to gynecological literature.

RÖNTGENOTHERAPY IN UTERINE FIBROIDS AND UTERINE HEMORRHAGE.

DR. GEORGE E. PFAHLER, of Philadelphia, stated that the treatment of uterine fibroids and uterine hemorrhage by means of the Röntgen ray was no longer a novelty. Sufficient excellent work had been done to make it a recognized method of treatment. The technic had been rather definitely established, and it only remained for the attending gynecologist to determine in each individual case the line of treatment, whether surgical or röntgenological, that would be of the greatest amount of benefit to the patient, with the least inconvenience, shock or risk. This treatment had received the support of many of the leading gynecologists of Europe and was gradually receiving its just recognition in America.

During the past nine years there had been treated probably between 2000 and 3000 patients of the class under consideration.

The indications for the treatment of hemorrhages due to myomas, as given in a recent paper by the author, were: 1. All cases of myoma in older women in whom there was already a well-advanced anemia, which might be the cause of an anemic heart. 2. All elderly and young women with myomas, in whom there was marked organic heart disease, diabetes mellitus, chronic nephritis, marked lung disease and goiter with cardiac symptoms. 3. All patients beyond the age of forty in whom there was no contraindication to the treatment. In general, the older the patient and the nearer she had approached the menopause, the more prompt and satisfactory would be the result. Under forty röntgenotherapy was not the method of choice, but good results could be obtained, although the younger the patient, the more treatment would be required. Even in patients under forty, if the alternative was complete extirpation

of the uterus and adnexa, röntgenotherapy should be seriously considered, for it was claimed that even with the disappearance of the Graafian follicles and the destruction of the reproductive function that there was a preservation of the internal secretion.

It was also possible that there would be a regeneration of the ovaries in young women, with the possibility of subsequent menstruation. This had occurred in one of his patients, a woman of thirty-four, in whom, after all the symptoms of fibroid had disappeared, and after complete cessation of the menstrual period for several months, there was a return of normal menstruation which had continued normal for about five years, and now was gradually diminishing. During these five years she had enjoyed excellent health. This possibility should be kept in mind.

The author quoted Gauss as believing that all cases of myoma should be treated by radiotherapy, because the lowest mortality ever claimed for operative methods was from 3 to 5 per cent., while in his second and third group in which the doses were from 175 to 1500 X-units, there were no deaths. He thought this alone should justify the treatment.

In hemorrhage due to fibroids, he believed it was always desirable to bring about at least a temporary menopause. When the patient was treated from any necessity during the child-bearing period, it would sometimes be an advantage to secure only a temporary cessation of the menses, for it was generally recognized now that the action of the rays was on the tumors as well as the ovaries. He believed we would find it possible to cause the disappearance of the tumor without actually destroying the action of the ovaries.

From a study made in a previous paper the author found that 75 per cent. of the tumors had disappeared, but from the fact that in the early cases treated there was a progressive disappearance of the tumors after discontinuing treatment he was led to believe, but not yet able to prove, that they would probably all disappear. The third case treated was a patient forty-nine years of age, who had a tumor which extended to the umbilicus at the beginning of treatment; at the end of a year it was the size of a grapefruit, and at the end of the second year it was the size of an orange, and when last examined, five years after beginning treatment, which was now about four years ago, the tumor had entirely disappeared.

The action of the rays was effectual on other than the ovary and fibroid. In 75 per cent. of all cases where there had been adhesions of the genital organs, Fraenkel found they had improved or entirely disappeared after Röntgen treatment. Firmly fixed uteri became movable, thick bands in the parametrium softer and less prominent, and bands in Douglas' pouch could no longer be felt when placed under tension. In one case a firmly adherent ovarian cyst became movable.

Since he had been using massive doses, and giving a great many doses in a short time, a number of patients had complained of lassitude, nausea and sometimes vomiting, which lasted a day or two and occasionally three. At first, this was thought to be due to an

effect upon the ovaries, but he had seen it also in extensive breast treatments, in the treatment of a large sarcoma of the hip, and in the treatment of carcinoma of the liver in a man. He believed these effects were due to the inhalation of the gases which were generated in the neighborhood of the high-tension currents. This was noticed now because of the multiplication of doses given on one day, and also because the more penetrating rays now used required a much higher voltage, which gave more brushing from the machine and wires. He was making some investigation along these lines and believed that he was gradually eliminating these constitutional effects.

Krönig reported 64 cases of carcinoma that were treated for the prevention of secondary growth after operation. Of these, 43 were treated almost exclusively with unfiltered rays, while 21 cases were treated partly with filtered and partly with unfiltered rays. Twenty-three of the 41 cases undoubtedly died with carcinoma. From following the subsequent history of 21 cases in which filtered rays were used, 19 were undoubtedly free from carcinoma. Sufficient time had not elapsed to speak of them as definite cures, yet the result is so unusual that he said it ought to be credited to the treatment, and that recurrences were not so frequent when filtered rays were used after operation.

CONCLUSIONS.

1. Röntgenotherapy must be looked upon as a very efficient adjunct to the gynecologist's armamentarium, and while he believed that the ray should be applied by the röntgenologist, he should at the same time work hand in hand with the gynecologist.
2. Deep röntgenotherapy stopped the hemorrhage associated with uterine fibroid. This was followed by a gradual disappearance of the tumor. This atrophic process might extend over several years and continue long after the cessation of treatment.
3. The treatment of metropathic hemorrhage was almost uniformly successful.
4. Uterine hemorrhage occurring at the menopause, when not malignant, would usually respond very quickly. There should be an increase in weight and an improvement in the blood condition following the treatment, and when this did not occur suspicion of malignancy should be aroused.
5. Some good results could be obtained in inoperable carcinoma. The deep röntgenotherapy should be especially recommended as postoperative treatment in all cases.

TECHNIC AND EXPERIMENTAL APPLICATION OF HARD RAYS FOR DEEP RÖNTGENOTHERAPY.

DR. LEWIS GREGORY COLE, of New York, by invitation, presented a paper on this subject.

In order to demonstrate the superiority of the Coolidge tube to the standard type of tubes and to prove that with the Coolidge tube

an amount of x-ray equivalent to an erythema dose might be administered to a tumor 3 inches below the surface without endangering the skin itself or intervening tissues, the following experiments were submitted, showing: 1. That most of the rays from the ordinary tube, operated at its greatest penetration with a standard transformer were absorbed in the first inch of the tissue, if no filter be interposed. 2. That with the ordinary tube, operated to its fullest capacity on such an apparatus, no filter being interposed, $11\frac{1}{2}$ minutes were required to obtain an amount of x-ray equal to an erythema dose 3 inches below the surface and that sixteen times an erythema dose was meanwhile administered to the skin. 3. That with the Coolidge tube a full erythema dose could be administered to the skin in thirty seconds, if no filter be interposed. 4. That with the Coolidge tube four Hampson units could be applied to the surface in one minute, through 3 millimeters of aluminium. 5. That with the Coolidge tube a dose of four Hampson units could be obtained 3 inches below the surface in six minutes through six ports of entry, using a 3-millimeter filter.

The experiments undertaken in proof of these tenets consisted of the röntgenization of an area 3 inches below the surface of a piece of meat 6 inches thick, a depth of tissue calling for a penetration about equal to that required for treating a cancer of the pylorus or cancer of the uterus. The surface of the meat was 6 inches from the focal point. The doses were measured by Hampson pastilles, one placed on the surface of the meat, a second imbedded 1 inch deep, a third located 2 inches from the surface, and a fourth 3 inches from the surface.

The first experiment showed the inefficiency of the treatment by the ordinary Röntgen-ray tubes, when neither filters nor the cross-fire method was employed.

The second experiment indicated the wonderful possibilities of the high-power penetrating rays from the Coolidge tube, filtered adequately and administered through six ports of entry by the cross-fire method.

In this test, one Coolidge tube was used, operated at a high penetration by a standard 4-kilowatt transformer, and the soft rays were filtered out with 3 millimeters aluminium. Six exposures of one minute each were sufficient to obtain a dose 3 inches below the surface.

The use of six ports of entry eliminated the danger of burning the skin so that each surface area received only one erythema dose.

Tests concerning the burning qualities of filtered and unfiltered rays brought the following conclusions:

An amount of unscreened x-ray necessary to change the pastilles from zero to four on the Hampson scale was considered an erythema dose and six Hampson units was considered a limit of safety. If, however, a ray of high penetration emanating from a tube backing up 8 inches parallel gap was screened by 3 mm. of aluminium, an

amount of x-ray far exceeding four or six Hampson units might be applied to the skin with safety.

In the treatment of desperate cases of cancer which were bound to die he increased the amount of the highly penetrating screened ray until he was giving twelve to sixteen Hampson units or three to four times the standard erythema doses through each port of entry. When these tremendous doses were given care must be observed that the areas should not overlap and scar tissue should be protected from getting the full force of the ray.

In one case which had been diagnosed as mediastinal sarcoma, he gave twenty treatments through twenty ports of entry, each one being $3\frac{1}{2}$ inches square on the surface. Each treatment was given with an 8-inch parallel gap, ten ma., circuit, 6 inches distance from the skin, four minutes time, dose twelve to sixteen Hampson units.

With the old type of tube and without screen or cross-fire, six Hampson units was about the limit that could be applied to the skin. If this were directed to a tumor 6 inches below the surface, only about one-sixteenth of the energy would reach the tumor, therefore the tumor would receive about three-eighths of one Hampson unit.

With this mediastinal tumor twelve to sixteen (fourteen average) Hampson units measured beneath the filter were applied to the surface every day except Sunday. One-fourth of that or an average of three and one-half Hampson units was applied to the growth itself at each treatment and twenty ports of entry were employed for each series; therefore three and one-half times twenty, or seventy Hampson units were applied during the first series and by the time the first series was completed the skin had so far recovered that he repeated the procedure, beginning the second series within ten days after the first series ceased. With each dose of this series about twelve Hampson units were applied to the skin and about three Hampson units reached the tumor mass. Twenty more exposures were given, making sixty Hampson units, a total of 130 Hampson units applied to the tumor itself, more than 150 times the amount that could have been applied without the high penetration rendered possible by the Coolidge tube, the screen, and cross-fire method of exposure.

Two months later, a third series of twenty treatments was given, making a total of 190 Hampson units applied to the tumor mass as compared with about one or one and one-half Hampson units that could have been applied to them with the standard tubes without the screen or cross-fire.

DISCUSSION.

DR. HOWARD C. TAYLOR, of New York City, asked Dr. Pfahler if in the treatment of idiopathic hemorrhages, which occurred in young women, he was sure there was not some permanent injury done to the ovaries. It would seem to him with an organ as delicate

as the ovary, there were a certain number of cases in which pregnancy had subsequently taken place, and on account of some injury the offspring had not been as perfect as it would be in other instances.

DR. JOSEPH BRETTAUER, of New York City, stated that he had x -ray treatments started for him in his cases ten years ago when mild or fractional doses were used, because at that time nothing was known about filters. Then there were not tubes to send much current through, and while a symptomatic cure was only expected, to-day an absolute cure was expected in many cases.

As to the future of young girls in whom he had tried the x -ray treatment, the result had been beneficial. There was no cessation of menstruation, but in one case there was delayed menstruation. Instead of menstruating every two weeks, she menstruated every five or six weeks in a very moderate amount.

DR. JOHN G. CLARK, of Philadelphia, stated that he was definitely in favor of x -ray treatment in women over forty, and particularly those approaching the menopause. These cases with hemorrhage at the menopause had been singularly satisfactory ones to treat and these patients had been extremely grateful for having been saved the hazards of an operation.

During the last winter three or four of these cases had been treated by the x -ray. One had given him a serious scare lately on account of an intense uterine colic taking place three weeks subsequently and immediately he thought there was necrosis of the uterus. Fortunately he did not know what did happen, but whatever did happen subsided. The patient had not bled since and she was now perfectly comfortable.

DR. THOMAS J. WATKINS, of Chicago, asked if there was any evidence to show that the x -rays produced intraperitoneal adhesions.

DR. PFAHLER, in closing the discussion, and in answering the question of Dr. Taylor with regard to possible subsequent injury to the ovary, said he could not answer it definitely. It was known, however, that the ovary had wonderful power of regeneration just as the testicles did.

With regard to the question of Dr. Watkins concerning intraperitoneal adhesions, he did not know any intraperitoneal adhesions would be produced by the x -ray, but according to investigations that had been made, many of these intraperitoneal adhesions had become absorbed as the result of x -ray treatment and the uteri had become freely movable.

As to the question of expense in a hospital he presumed it was very hard to keep an account of the exact cost of these things because one had to have the x -ray plates, the lighting, the electricity, the equipment, the services of the help around, and the services of a Röntgenologist. All these things entered into the actual expense of that department. Roughly speaking, the expense in a hospital would be about \$1 per dose. He had estimated in his private work that the expense was \$1.50 per dose, that is, in giving these doses for fibroid tumors of the uterus. If the fibroid was small, and situated in the

pelvis, one could get along with three or four doses. The number of doses would vary with the individual case.

DR. BRETTAUER asked whether the estimate included the use of the Coolidge tube.

DR. PFAHLER replied that it included everything.

DR. POLAK asked what the life of a Coolidge tube was.

DR. PFAHLER replied for the treatment of ten or fifteen patients. However, this was only a rough estimate.

THE USE OF THE GALVANOCAUTERY KNIFE FOR EXCISION OF MAMMARY TUMORS FOR MICROSCOPIC DIAGNOSIS.

DR. J. WESLEY BOVÉE, of Washington, D. C., called attention to the frequency of cancer of the breast and stated that it was universally considered to be increasing. Many writers were exhibiting great anxiety over what was designated the positively alarming increase in frequency of this terrible disease. Nearly all writers on this subject regard cancer as originally a local disease. This view might be pardonably questioned in cases such as we had seen in which the disease in an unusually early stage was found in both breasts and apparently in the spinal cord coincidentally. Amputation of both breasts on the same occasion was done, symptoms of spinal involvement were noted almost immediately afterward, ending in death a few months later. No autopsy was made, however, to prove positively the presence of cancer in the cord. Clinically the patient was a victim of that affection. The breast invasions were pronounced by the pathologist as being the earliest he had ever seen and he voluntarily expressed the opinion that the disease had been eradicated by the operation.

In 1906 he operated on a widow, sixty-seven years of age, for a large ovarian papillomatous cyst, after aspirating 20,000 c.c. of fluid twenty-eight days previously. Being very peculiar, she was allowed the privilege of being largely and constantly cared for by an intelligent spinster daughter and some mystery was apparent about the case. This was solved a few days before the patient left the hospital by the conscience-smitten daughter confiding in him that her mother had had a right breast cancer for thirty years and would like his advice about it if an examination was not a necessity. He succeeded in examining the breast and found an ulcerated tumor about 5 cm. in diameter in the outer lower quadrant of the right breast that included the nipple and was fairly movable. One enlarged gland was found in the axilla. The ulcer had existed but two months and operation, although advised, was refused.

Last year, at the age of seventy-five years, she died of general carcinosis, according to the belief of the attending physician.

A more striking example of the possible long existence of cancer was the case reported by Crevelli and Trinca, who, after commenting on recorded cases of chronic scirrhus cancer existing over twelve, fifteen, seventeen, twenty, twenty-three and thirty-two years, respectively, proceeded to relate their observation of a case of chronic

scirrhous cancer of the breast in a woman dying in her ninety-fourth year. Her tumor began as a hard nodule near the right nipple at the age of forty-six years, grew slowly for ten years and was never large or prominent until shortly before death. At the age of seventy-three years she became the patient of Crevelli who treated her during the remaining twenty years of her life. Rapid growth began in January, 1910, and spread to the subscapular region, being the first gland metastasis.

The author did not discuss the diagnosis either clinically or microscopically, of cancer of the breast or whether (young) tumors should always or usually be removed promptly. He called attention to Warren's operation which was a modification of that of T. G. Thomas. The Warren operation referred to involved making an incision along the outer and lower border of the breast, separation of the whole or a portion of the posterior side of the gland from adjacent tissues, exploration or removal of a tumor or tumors of the breast thought to be benign and proper closure of the wound.

That any tumor of the breast furnished an indication for amputation of that organ certainly should not be maintained.

That early malignant tumor did furnish a peremptory indication for radical operation was beyond peradventure. Between these classes lay many breast tumors that were in the twilight zone of malignancy. Aside from the all-important conscientious treatment of the breast tumor there remained as a constant factor the features of diagnosis and treatment based upon it. One naturally avoided humiliation born of improper treatment based upon a failure to properly diagnose a breast tumor.

At times clinical evidence might conflict with microscopical findings and be the more reliable. This was especially emphasized in the rapid frozen section work done during operations when many sections failed to reveal malignant changes which nevertheless might exist in unexamined portions of the tissue removed for the purpose. This feature lessened the reliability of such work, but by no means discredited it and it remained an important element of the armamentarium chirurgicum for the treatment of such growths.

Having shown the necessity for such methods of securing specimens for microscopical diagnosis, the author called attention to the grave dangers encountered in this feature of the procedure. He quoted Mayo as saying—"If a suspicious tumor in the breast be localized, it is wise to remove the entire tumor for examination without cutting into it and then, if necessary, do a radical operation at once. If removal of specimen could not be followed by immediate extirpation, the wound in the growth should be sealed by the use of the actual cautery or pure phenol."

The dangers encountered in securing specimens for microscopic examination were thus seen to be contamination of uninvolved structures by the cancerous tissue and by undue irritation stimulating an increased lymphatic absorption.

Recognizing the danger of contamination during resection and of lymphatic stimulation incident to such manipulations various plans

of obviating these dangers had been employed. Rodman said in reference to securing frozen sections in cases of doubt, "There is no danger in such a practice if a hot iron is used at the time, even if the case is cancerous." Babler employed Harrington's antiseptic solution from one-half to one minute in the resection wound. Formaldehyde had been employed similarly.

Shortly after installing the Dowens' electrothermic angiotribe in 1903, the author began experimentation with it in the treatment of the uterus and of the breast. For galvanocauterization of the advancing cervical cancer he devised a cooling vaginal speculum that had proven very efficient, and in breast tumors localized and only suspicious of malignancy, he applied the galvanocautery for excision of the growths or removal of portions of doubtful tumors for microscopical examination.

In this work, carried out in many cases, he had found but one objection to it when properly used. This consisted of the slowness of the cautery knife when the breasts had been large. This led him to change the technic somewhat. To economize in time he adopted the plan of cutting the tissues for a short distance with a sharp knife and with the flat sides of the cautery knife immediately sealing to a considerable depth the sides and bottom of the wound. The use of the knife was again resumed to be promptly followed by the cautery as before. This process was continued until the tissue desired was entirely removed, leaving behind a crater with charred boundaries. The hot oil that was fried from the tissues during this procedure was taken up promptly with small pledgets of cotton or gauze in the grasp of forceps and at once discarded. The wound was now covered carefully and the report of the microscopical investigation awaited. If the tissue was reported to be malignant a radical operation was at once performed. If it was reported to be benign the surgeon might yet decide, from a consideration of the clinical evidence, to perform a radical operation.

If the operation was not to be extended, the wound margins were trimmed of all cooked tissue and proximal portions of severed milk ducts and the wound closed completely with sutures. The J. Collins Warren operation he had performed entirely with the knife and cautery with satisfactory results. One would be surprised at the facility with which he could perform a breast resection by this plan, after a little practice.

THE VALUE OF A MORE FREQUENT EMPLOYMENT OF EPISIOTOMY IN THE SECOND STAGE OF LABOR.

DR. BROOKE M. ANSPACH, of Philadelphia, said that episiotomy should be most frequently indicated in forceps operation, delivery with the occiput posterior, and breech presentations.

In difficult forceps cases there was more than the ordinary risk of rupture of the perineum. The use of the instrument increased slightly the diameter of the passenger and the delivery was and often must needs be more rapid than normal. He had repeatedly

gone on with such a case, realizing that every pull increased the damage to the perineal floor, but relying on the subsequent perineorrhaphy. In this trust, however, he had sometimes been sorely disappointed, and now during the course of a forceps operation when rupture of the perineum appeared inevitable, he promptly did an episiotomy, and so far there had been no occasion to regret it. Delivery with the occiput posterior produced an extraordinary strain upon the perineum which not infrequently resulted in a complete tear. With such a position of the occiput episiotomy was nearly always indicated.

The regard in which episiotomy had been held generally was not high, and this opinion was the result possibly of a misconception of the operation. Those who have little or no regard for it, viewed episiotomy as a slight nicking or cutting of the vulvar ring at right angles to its circumference, at a time when the orifice was already enormously dilated. Such a procedure did scarcely anything more than present a tear of the mucous membrane. The fascia and muscles beneath were already overstretched and torn before it was undertaken.

The operation of episiotomy which would be of service was a division of the vulvar ring from one sulcus downward and obliquely outward on a line between the anus and the tuber ischii. This incision divided the pelvic fascia, the constrictor vagina; the transverse perineal muscles, and a part of the levator ani.

Episiotomy was spoken of by Lusk as the operation of the young obstetrician.

Episiotomy was especially serviceable in forceps delivery where the head was evidently too large to be brought through the vulva without laceration. Its performance would frequently save a tear of the pelvic floor in the lateral sulci and prevent a central tear of the perineum.

The author quoted Jewett as saying that "No method yields better results for the ultimate integrity of the perineum than episiotomy rightly timed and properly executed. The ultimate condition of the pelvic floor after episiotomy, correctly performed, was even better than after any natural deliveries in which the parts escape rupture. The tonicity of the structures frequently remained as perfect as in the nonparous woman. The success of the incision in preventing lacerations depends, as already intimated, upon so timing them as wholly to anticipate the tearing and upon carefully adjusting the location and direction of the cuts. This apparent simple procedure, therefore, was one in which even the accomplished obstetrician may find room for the exercise of skill."

The value of the operation and the frequency with which it must be used depended upon how often perineal injuries occurred during labor, and how easy it was to repair them. De Lee voiced the author's sentiment when he declared that an anatomical study of the pelvic floor after delivery always showed evidences of injuries to all its structures; the connective tissue was torn in many places.

The layers of fascia were loosened; the levator ani muscles lacerated more or less; the urogenital septum was always ruptured, the perineal body frequently, and all the tissues were bruised, showing larger or smaller hemorrhages and sugillations. The later results of these macroscopic and microscopic injuries were shrinking and atrophy of the pelvic diaphragm, relaxation of the same, prolapse of the urethra, vagina, bladder, uterus, all depending upon the extent of the traumatism.

In regard to the technic of episiotomy, it was generally recommended to divide the tissues with scissors which might be especially constructed, heavy and round-pointed. He believed this practice inferior to the use of the ordinary scalpel or probe-pointed bistoury protecting the head by two fingers inserted within the vaginal orifice, one on either side of the projected incision. The necessity for the operation having arisen and the decision to employ it decided, the patient might be given enough ether to benumb her sensibilities, the advancing head pushed back slightly, and the operative field washed with sterile soap and water and bichloride solution. The incision was then made in the manner already indicated, one sweep of the knife being better than a succession of cuts, and the sphincter ani being avoided by pushing it to one side with the thumb applied to the skin surface of the perineum. After the incision was made, the bleeding was controlled temporarily by gauze pressure. The next pain usually engaged the presenting part in the wound, and delivery was effected in a very few minutes. While the accoucher was awaiting the completion of the third stage, any oozing might be controlled by catching the bleeding point with an artery forceps, gauze pressure, approximating the edges of the incision with tenacula or manual pressure. In closing an episiotomy incision, the deepest parts of the cut must be exposed and brought together with buried catgut sutures. One must be particularly careful in deep episiotomy wounds to reattach the lateral structures to the central one. In addition to the deeper buried sutures of catgut, one or two relaxation sutures of silkworm gut embracing the entire area of the incision, should be employed. The mucosa and skin edges should be approximated by interrupted sutures of silkworm gut.

The subject of episiotomy might appear to be a very important one, and yet, in actual practice, what a considerable time and trouble was given by the obstetrician to the avoidance of perineal injury by securing the slow delivery of the presenting part in the best position possible. In spite of this care, were we not frequently disappointed in the ultimate results? No sutures might be required, but just the same the patient had a relaxed vaginal outlet, and possibly later, cystocele and rectocele. Was it not worth while, therefore, to consider episiotomy seriously? Would not this operation also reduce somewhat the fetal mortality and maternal morbidity? Was it not to every practitioner of obstetrics a question much more frequently pertinent than the larger operative problems of pubiotomy, Cesarean section, and the use of the obstetric forceps?

To sum up his own feeling in the matter, and to serve as a basis for discussion, the author drew the following conclusions:

1. The customary methods in obstetrics did not prevent a large number of perineal injuries which required treatment subsequently.
2. Episiotomy would reduce the physical incapacity following labor.
3. Episiotomy by facilitating delivery would reduce infant mortality and maternal morbidity.
4. The recognition which a method no practitioner of obstetrics could afford to neglect, should be given to this simple operation.

THE TREATMENT OF PYELONEPHRITIS IN PREGNANCY.

DR. RALEIGH R. HUGGINS, of Pittsburg, said that pyelonephritis during pregnancy did not differ from that occurring in the non-pregnant so far as the pathology was concerned. It had been concluded that the most important predisposing cause was urinary stasis brought about by pressure upon the ureters by the enlarged uterus. To this was added the presence of organisms carried to the pelvis of the kidney either through systemic channels or by direct upward extension through the ureter.

Eight years ago in a paper read before the American Association of Obstetricians and Gynecologists, the writer called attention to the importance of toxemia during pregnancy as an etiological factor in the predisposition to gall-bladder infection, etc. In a study of his cases of pyelitis complicating pregnancy he arrived at the same conclusion, namely, that the most important predisposing cause was the effect of the toxins of pregnancy upon the renal epithelia and parenchyma.

Here, as elsewhere, degenerative changes occurred which lowered the normal resistance of the tissues, and when the colon bacillus was carried to the organ infection might ensue. Careful study of the cases of pyelonephritis observed by the writer showed that the majority gave a clear history of symptoms indicating a marked degree of intoxication long before infection of the kidney occurred. Nausea and vomiting and other signs of toxemia appeared in the early weeks. The first and most important factor in the consideration of these complications during pregnancy was to rid our minds of the idea that the milder symptoms were physiological and to be expected. Pregnancy became a pathological state in many women and was doubtless due in most instances to the inability of the liver and kidneys to perform the extra duties imposed upon them during the pregnant state. That the degree of toxemia varied was undoubtedly true and in many women it was present only in a slight degree. The pregnant woman was seldom in a state of perfect health. There were many cases which did not have persistent vomiting nor did they develop eclampsia, and yet presented many toxic symptoms such as headache, lethargy, insomnia, irritability, nausea, elevated blood pressure, and slight urinary disturbances. Under these circumstances the resistance to any form of

infection was less than it was in good health. Dr. Charles B. Reed had called attention to this factor in the predisposing cause of pyelonephritis, and was the only one so far as the author knew who had attached so much importance to this factor in the etiology.

Ureteral compression might undoubtedly play an important part in some instances, but it was difficult for one to understand how sufficient pressure could occur in the second or third month of pregnancy to produce ureteral stasis. In the later months this could easily be accepted as a possibility, but even then there was room for much argument. In the writer's experience severe infection of the pelvis of the kidney occurred but rarely in the presence of large fibroids or ovarian cysts, unless the tumor was impacted in the pelvis and was causing other marked symptoms from pressure. If stasis caused by pressure was an important factor, it seemed strange why it did not occur often in the later months, and if this theory was true, it should be a frequent complication of pregnancy. When the anatomy of the ureter was considered it was even more difficult to understand how it might yield to ordinary pressure. A structure so firm and capable of exerting force sufficient to drive the urine into the bladder under great resistance would require a great degree of compression to cause stasis in the outflow of urine. Certainly, more than the weight of the uterus during the early months of pregnancy was necessary.

The experience of the writer in severe cases was limited to twelve. Nine were primipara; death occurred in two patients seen in consultation where conservative measures were too long employed. The uterus was emptied in two patients when there was an extensive infection in both kidneys which did not yield to any form of palliative treatment. It was in primipara that we found the greatest danger from the toxins of pregnancy. In establishing a tolerance to the various changes which occurred for the first time much extra work was thrown upon all of the organs of elimination, particularly the kidney and liver. It was the impression of the writer that the serious cases of pyelonephritis occurred more frequently in primipara than in women who had borne children. If this was true, it was strong evidence in favor of toxemia as the principal predisposing factor in this form of infection.

Experiments led to the conclusion that ascending infection reached the kidney through the lymphatics more frequently than was formerly supposed. If this was correct, much might be learned from a careful search for the primary focus. This might be found in the bladder itself. Owing to the intimate relationship between the lymph system of all abdominal viscera, and that of the kidney, the primary infection might lie in the Fallopian tubes, appendix or the gall-bladder.

In severe cases the diagnosis was usually made without difficulty. The evidence of toxemia, high leukocytosis, pus in an acid urine, with the presence of colon bacilli in pure culture, were symptoms which were most suggestive. When pain was a prominent feature, pleurisy, infection of the gall-bladder, salpingitis, or stone in the ureter or

kidney must be excluded. There was usually a pronounced rise in the temperature and chills. If not contraindicated, cystoscopy with catheterization of the ureters had the same field of usefulness here as a diagnostic measure that it did in the nonpregnant. The important factor in the recognition of this complication of pregnancy was to remember that in the presence of the above symptoms it was the condition most likely to be found.

The writer had been impressed that the treatment in some instances required careful judgment. The mild cases were usually self-limited and responded to rest, proper diet and urinary antiseptics. Irrigation of the pelvis of the kidney should be done if the infection did not yield to simple measures. Severe pyelitis was always a danger for both mother and child and if the clinical manifestations did not subside promptly under the above treatment, than one must consider nephrotomy or the interruption of pregnancy. When surgical measures were not employed in some manner, death not infrequently occurred.

The writer had recently observed such a case. This patient, who was pregnant for the first time, presented from the beginning of pregnancy all the signs of severe toxemia. In the early weeks there was persistent nausea and vomiting which continued to a greater or less degree until the onset of symptoms characteristic of pyelitis. She was treated in a conservative manner. The condition grew worse and at the end of the sixth month of pregnancy death occurred from exhaustion following death of the fetus and its premature expulsion from the uterus.

Owing to the better knowledge of the pathology and treatment of the various forms of toxemia associated with pregnancy, it was seldom considered necessary to advise the interruption of pregnancy. It was rarely indicated, but in cases such as he had reported he was at a loss to know what other method of treatment to adopt if the life of the mother was to be saved.

The author closed his paper by relating in detail two interesting cases in which pregnancy was terminated with gratifying results in both instances.

REVIEWS.

THE DUCTLESS GLANDULAR DISEASES. By WILHELM FALTA, Vienna. Translated and edited by MILTON K. MEYERS, M. D., Neurologist to the Lebanon Hospital and to the Dispensaries of the Jewish and St. Agnes Hospitals, Philadelphia. With a foreword by ARCHIBALD E. GARROD, M. D. (Oxon.), F. R. C. P. (London), F. R. S., Physician to St. Bartholomew's Hospital, London. pp. 673, with 101 illustrations. Philadelphia: P. Blakiston's Son & Co., 1915.

The student of the diseases of the ductless glandular system has lived in a world of isolated observations, physiological experiments,

and theoretical deductions. These Falta attempts to correlate. Their experimental physiology and pathology has been dealt with exhaustively by Biedl, so Falta confines himself almost exclusively to the clinical aspects of these diseases. He bases this volume upon his own observations, but quotes largely from other writers. His work is really a review of the literature with a liberal addition of illustrative cases of his own and a general discussion of each of the diseases described. In the effort of the American editor to furnish a faithful rendering of the German text, he has erred, perhaps, in a too literal translation, the Teutonic arrangement of phrases making the task of reading more difficult. Recent English and American views are presented by the editor in a brief addendum to nearly every chapter and the book closes with a classified bibliography. The author feels that it is important from the clinical point of view not to associate the meaning of internal secretion exclusively with the ductless glands, because probably many cell-complexes of the animal organism possess an internal secretion. He designates as ductless glands, and their collective total as the ductless glandular system, a series of organs whose proper function appears to be the production of especially important hormones which are provided with powerful physiological characteristics and whose common property is that they separate out their specific secretion directly into the blood path. He attempts to explain the ductless glandular diseases as due exclusively to quantitative alterations in the ductless glands, not to dysfunction of the glands. After a few remarks upon the influence of the ductless glands on growth and on regulation of metabolism and an outline of the embryology of the ductless glandular system, the author describes his classification of the ductless glands. This is founded upon their physiological actions upon metabolism. In the acceleratory, catabolic, or dissimilatory group he includes the thyroid, posterior lobe of the hypophysis, chromaffin tissue and glands of generation. In the retardative, anabolic, or assimilatory group he places the parathyroids, anterior lobe of the hypophysis, suprarenal cortex and interstitial glands. The greater part of the volume is devoted to the affections of the individual glands. Of particular interest to students of gynecology and diseases of children are the chapters dealing with cretinism, tetany, diseases of the thymus, status lymphaticus, diseases of the sexual glands and vegetative disturbances that do not depend directly on diseases of the ductless glands, including infantilism, dwarfism, chondro-dystrophy and Mongolism. An important chapter is that on the relation of the pancreas to diabetes. The writer deprecates the recent tendency to regard individual diseases of the ductless glands as pluriglandular diseases and would reserve this term for those which from the clinical picture are apparently due to involvement of the whole or a large part of the ductless glandular system. These cases are probably due to some infection which results in a high-grade sclerotic atrophy of several of the ductless glands and they show symptoms of a combination of the ordinary ductless gland disorders. This effort to separate as far as possible distinct types rather than to

emphasize the transition of individual cases into each other increases the value of the volume to the student of that complicated and as yet obscure subject, the diseases of the ductless glands.

SCOPOLAMINE-MORPHINE ANESTHESIA. By BERTHA VAN HOSEN, M. A., M. D. Attending Gynecologist to Cook County Hospital, Provident Hospital and Mary Thompson Hospital. The House of Manz, Chicago, 1915.

AMNESIA AND ANALGESIA IN PARTURITION (TWILIGHT SLEEP). By ALFRED M. HELLMAN, B. A., M. D., F. A. C. S. Adjunct Attending Gynecologist and Obstetrician Lebanon Hospital, Attending Gynecologist German Hospital Dispensary, Fellow New York Academy of Medicine, Etc., Paul B. Hoeber, New York, 1915.

The already extensive bibliography on the subject of anesthetic methods which are popularly denominated as "twilight sleep" is herewith enriched by two additional contributions. Dr. Van Hosen presents her book as a personal record of an experience with scopolamine-morphine anesthesia not only in obstetrics but in general surgery. After describing the particular methods employed in the hospital for inducing scopolamine-morphine anesthesia, she presents a report of 5000 other cases including all forms of operations except those on children and Cesarean sections. The method of using this form of anesthesia in Dr. Van Hosen's hospital service includes a special type of delivery bed, which is fully illustrated. One notes that the patient is quite firmly strapped in place, evidently to guard against the acknowledged struggling so often present in these cases. If the patient, as shown in the illustration, is an actual case of labor fault must be found with the method of preparation, as there is no evidence of any shaving having been resorted to. All hospitals and even private practitioners have accepted this preparation as the *sine qua non* of successful obstetrical deliveries. It is to be hoped that this error in technic is apparent rather than real. The admission which the author makes that the patients are apt to be irrational and are therefore to be confined in a special form of crib such as that described is scarcely to be regarded as a favorable aspect of the method. Dr. Van Hosen describes a considerable number of cases in which the special effects of the anesthetic are set down. It must be admitted that a great many of them are unfavorable. The book is concluded with a chapter on the mental effects of "twilight sleep" by a psychologist, in which is presented a muddle of observations that scarcely permit of sensible conclusions by the ordinary reader. The author herself admits that the phenomena observed are very complex and could only be analyzed by an experienced clinical psychologist of whom, according to her statement, a great many special qualifications are demanded.

Dr. Hellman's book presents a laudable effort to give to the profession a concise statement about the uses of "twilight sleep." This is inspired by the numerous interrogations made by patients to their medical advisers. The author believes that the attempt to

provide alleviation from labor pains by means of scopolamine-morphine seminarcoisis is simply in line with all the other efforts that have been made since the introduction of ether in 1847. The question resolves itself, however, into whether an anesthetic is really necessary as a routine procedure in obstetric cases, or whether this should be limited to those women who actually require the same. It is true that the dividing line is difficult to draw and for that reason all the more caution should be exercised by the adherents of the procedure in advising its general employment. Dr. Hellman describes the so-called Freiburg method, simply touching upon the other procedures which have been recommended. The author's personal experience up to the time of writing the work is limited to a comparatively small number of cases which, however, have been carefully studied. His enthusiasm for the procedure seems to wane in his concluding paragraphs and the shortcomings of the method are acknowledged. His optimism, however, is shown by the statement that after several hundred thousand cases have been treated in this country, the women of America who feel that they need this treatment will be able to have it capably given them in every part of our land, and will no longer have to travel to Freiburg to have their babies. He also believes that until some better and more easily manipulated method is devised, the technic outlined by Krönig and Gauss will be the method of choice for alleviating the pains of childbirth. Whether this statement will be borne out by the results of the next few years, remains to be seen.

A MANUAL OF GYNECOLOGY FOR STUDENTS AND PRACTITIONERS.
By SAMUEL J. CAMERON, Assistant to the Regius Professor of Midwifery, University of Glasgow; Gynecologist and Assistant Obstetric Surgeon to the Royal Glasgow Maternity and Women's Hospital; Gynecologist to Out-Patients, Glasgow Western Infirmary. Illustrated. Price \$5.00 net. Longmans, Green & Co., New York. Edward Arnold, London.

This work presents in concrete form the teachings of the Glasgow School in gynecology and obstetrics. A number of contributions to medical literature have already appeared from this source, which is one of the best known schools of medicine in Great Britain, and presents a vast source of clinical material for study and treatment. The author is a lecturer in this institution and aims to set forth in an essentially practical manner the subject of gynecology as taught by him. The book takes up in the usual order the anatomy and development of the female genital organs, followed by a description of their various diseases and the treatment. The author's handling of various subject matter is in accord with the best practice of the day and with the exception of a few minor faults the book serves as an excellent manual for students and practitioners. In the treatment of various gynecologic conditions the references to medical measures are frequently unsatisfactory, especially as regards the prescription of various proprietary remedies. Both continental and English authors manifest too great willingness to recommend by direct

reference preparations which in this country, at least, are not considered safe or desirable to use. In fact several of the remedies referred to have been declared without the pale by our American Medical Association. The tendency to polypharmacy is also manifested, which in view of present-day tendencies seems rather unfortunate. In the description of the treatment of uterine prolapse the author takes occasion to condemn the Kelly suspension operation and also confuses it with the fixation procedures. The operation of ventro-suspension as advised by Kelly was intended mainly for the correction of uterine retrodisplacements and has served its purpose very well until the more recent round ligament suspensory operations have come into vogue. The author is very favorably inclined to the so-called interposition operation but does not call sufficient attention to the contraindications for the same, including moderate enlargement of the uterus due to endometrial or myometrial conditions. Taken on the whole the book presents a very satisfactory manual of gynecological work and its pages are not burdened with unnecessary references and descriptions. The illustrations are good, ample in number and clearly illustrate the text.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Influence of Adrenalin on the Blood Condition in Pregnancy.—G. Aymerich (*Ann. di ost. e gin.*, May 31, 1915) says that Foa has demonstrated that injections of adrenalin lessen the alkalinity of the blood, and increase its coagulative properties. Adrenalin is a substance that especially acts on the sympathetic system and the diminution of the eosinophiles is considered a manifestation of its action on the sympathetic. The function of the spleen is not well understood, but it is known to be both hematopoietic and hemolytic. The first is demonstrated by the presence of erythroblasts, and is very active during intrauterine life, when the medulla of the bones contains few nucleated red cells. In the adult the spleen does not have any hematopoietic function. It also is a lymphopoietic organ, forming lymphocytes, as do the lymphatic follicles and glands. Late researches have shown that the function of the spleen is of especial importance in pernicious anemia, the primary lesion being in the medulla of the bones. The spleen is also considered an organ having to do with the metabolism of iron. It furnishes a hormone that paralyzes the autonomic system, hence the increased activity of the intestine after splenectomy. The best known of the relations of the spleen with the endocrinous glands are those with the thymus. A certain antagonism between these two organs is observed in cases of thymectomy for Basedow's disease. The lymphocytosis of adrenalin is really a reaction of the spleen. In leukemia there is a certain increase of the cells, and in hemolytic icterus the reaction to adrenalin

is positive. The author gives the results of his observation of thirty-two cases of normal and pathological pregnancy. His conclusions are these: taking into consideration the diverse elements of the hematological formula, the injection of adrenalin causes a slight increase in number of the erythrocytes, while the amount of hemoglobin remains the same. This relation is the same in normal and in complicated pregnancy; the time of gestation has no effect on the results, which are the same in the puerperium. The neutrophiles are diminished constantly in nonpregnant as well as in pregnant women. The elements that are especially affected by adrenalin are the lymphocytes: they increase constantly in number until they have nearly doubled. There is no difference in this respect between pregnancy and nonpregnancy, or the puerperium. The eosinophiles diminish and even disappear altogether; equally in pregnant and nonpregnant women. The other leukocytes present inconstant variations. If we admit that the lymphocytes which follow the injection show that the spleen is functioning normally we should conclude that in pregnancy, normal or pathological, the function of the spleen is not disturbed. Considering the action of adrenalin on the vegetative nervous system, since we find little difference in the reactions to adrenalin in pregnancy or nonpregnancy, we should say that in pregnancy there is no increase of the sympathetic tone. A diminution of eosinophiles should not be considered as a specific manifestation of adrenal activity, nor of a stimulation by it of the sympathetic. In infectious diseases and in experimental infections the eosinophiles diminish. The use of nuclein and turpentine also causes a diminution of eosinophiles. Probably adrenalin has the power of stimulating the hematopoietic organs, especially the medulla of the bones, with a result of formation of new young elements. If this is true, injections of adrenalin may be used therapeutically in anemia.

Placental Fats.—Angelo Santoro (*Ann. di ost. e gin.*, May 31, 1915) considers the origin, function, and method of absorption of the fats found in the placental villi, and the action of the syncytial tissue of the villi in reference to these fats. He gives a short account of the researches published heretofore. His personal observations have shown that drops of fat exist in the syncytium of the villi in both normal and pathological placenta. Pathological conditions do not seem to affect the existence of these fats in the villi. Chemical examinations of fresh placenta have been made as well as of the blood in the retroplacental spaces, the veins, and the cord. He has shown that there exists in the blood of the pregnant woman an increase in the lipoids and cholesterin. This lipoidemia is especially noticeable at the end of pregnancy, while it is not observed in the early months. At the end of pregnancy the amount of these substances is double that seen in the nonpregnant woman. In the first eight days of the puerperium this amount of fats and cholesterin diminishes. The blood in contact with the villi of the placenta acquires special properties with reference to the nutrition of the fetus. The author finds three grades of fat content in the blood, the largest amount being in the retroplacental spaces, the medium amount in the placental veins,

and the smallest in the cord. In the placenta exists a depository of material necessary for nutrition, and a mechanism for the elaboration and transformation of the substances used by the ovum, which are similar to those contained in mother's milk. The authors conclusions are given thus: Fats are constantly present in the placenta. They are neutral fats, acid fats, soaps in small amounts, cholesterin, and volatile fatty acids. The neutral fats act as food substances, and constitute an integral part of all protoplasm, and are normally abundant in young tissues. Cholesterin and the ethers are found in various animal tissues in relation with phosphates, especially lecithin. They appear to serve to maintain the stability of the tissues, acting as lime does in the bones, which serves to fix the phosphates in the organism. These substances serve to fix the organic phosphates of the body. The higher fatty acids and soaps are important, being the most easily absorbed of the fats. There exist in the placenta all the forms of nutritive material that are used by the fetal organism. The syncytium acts as a selector of materials, having a special activity which allows the passage of only necessary substances into the fetal blood, and prevents the passage of others. This action is protective and defensive to the fetus. If this function is interrupted poisons and germs may pass through the placenta to the fetus. Not only are substances passed from the blood of the mother to the child, but they are elaborated by the placenta into new products which show the lipogenous power of the villi. In the circulating blood the neutral fats are most frequent. In the villi the acid fats and soaps are found, due to the activity of the villi. In the syncytium are found lipolytic ferments, and lipolytic activity is greatest in the intervillous lacunæ. In the retroplacental blood this activity is greater than in the vessels. The maternal blood in contact with the villi acquires a power of absorption of the fats which it contains, and which must be acted upon by ferments of the syncytium. There are also in the syncytium proteolytic ferments which act in the placenta transforming proteid materials and carbohydrates, and extracting from them materials for the formation of fats.

Hygiene of the Infant before Birth.—A. Pinard (*Ann. de gyn. et d'Obst.*, May-June, 1915) discusses the hygiene of the infant before birth, that is during intrauterine life, and also before conception. After giving a résumé of the work or absence of work that has been done in this line up to 1875, he gives the substance of an article by Tarnier at that date, to which he personally subscribes. The urine should be systematically examined, and during the last month it should be ascertained in what position the fetus lies. If there is any malposition it may be rectified before labor. If the head has not entered the excavation it should be assisted to do so. Examination should be made for this purpose three months before labor. During the last month arrangements should be made that the mother need not work. Under the influence of rest the length of gestation will be increased, and the weight of the children increased, while their development will be more complete. Overwork is a frequent cause

of premature labor. From the point of view of humanity and of the perpetuation of the race and increase of population it is necessary for the state to protect the woman during her pregnancy and the fetus during the last three months of its intrauterine life. He distinguishes puericulture before fecundation, puericulture during pregnancy, and puericulture after birth. Out of 188,214 infants weighed at birth 72,626 weighed less than 3000 grams: and 29,071 weighed less than 2500 grams. Out of 161 pairs of twins observed at the Baudelocque Hospital the weight was increased in the women who rested the last few months. Every woman should rest during the last three months from severe labor, and should leave any factory work that she is engaged in. Preventive measures may be used before conception which will increase the number of births and produce more healthy children. An increase in knowledge of the effects of alcohol and syphilis will reduce the production of imbeciles and degenerates. Education at the time of marriage will assist to attain this end. Criminal abortions should be combatted by the vulgarization of the knowledge of the respect due to human life. Copulation during pregnancy is a cause of prematurity and education will lessen this. A healthy fetus can be engendered only in a healthy uterus. Education will also assist in keeping the uterus in a more healthy condition and avoiding the effects of gonorrhea on the genitals.

Influence of Intrauterine Manipulations during Labor on the Morbidity and Mortality after Labor.—J. de Groot (*Arch. mens. d'obst. et de gyn.*, June, 1915) has made a careful study of all the cases of rise of temperature seen by him in the Utrecht Clinic and Polyclinic in the past two years, with reference to the number of examinations and manipulations made and the method of asepsis of the hands. His intention is to show that the use of sterilized rubber gloves in delivery is unnecessary. He says that much stress has been laid on bacteriological examinations and little on clinical findings. More stress should be laid on the results in morbidity and mortality than on bacteriological examination. His studies included internal explorations, in normal and pathological cases, premature artificial labor, tamponment of the uterus, manual delivery and artificial labor. He sums up his results thus: There were 84 cases of premature artificial labor; 56 cases of manual delivery in the Clinic; 98 cases of manual delivery in the Polyclinic; 38 cases of tamponment at the Clinic, and 79 at the Polyclinic. Thus we have a total of 355 cases without any deaths. In only a few cases was it possible to say that the manipulations caused the abnormal temperatures. In most of the cases it was impossible to say that there was any relation between the handling and the complications. If we can get such good results without the use of rubber gloves, it is not at all necessary to make use of these in obstetric work. Whatever is the nature of the vaginal microbes they are rarely sufficiently pathologic to cause a mortal infection. The author believes that the results after such infections are rather due to the condition of the vagina before labor began. Microbes coming from without depend for their virulence on

the sort of culture medium that they find in the vagina, but they are not generally very dangerous.

The Outraged Woman, Victim of War.—A. Herrgott (*Ann. de gyn. et d'obst.*, May-June, 1915) considers the position that the public and the physician should hold toward the victim of the lust of the German soldier within the borders of France, what should be done for her and for the infant that is born into the world unwanted and despised. The first question is whether we have the right to relieve this victim of the fetus that is not the result of her own desires, but of foreign force. Since this infant does not in any way menace the life of the mother we have no right to interfere with the pregnancy. The question of the hereditary influence of the father is not at all solved as yet. Neither should we consider the mother dishonored, since she had no voluntary part in her act. Should we produce an abortion in such a case it would be only an intrauterine murder. Our duty as physicians is to preserve life. Also there is danger to the mother in artificial interruption of her pregnancy. The life of mother and child should both be sacred. The state should take care of these mothers and also of the poor, unwanted infants, and see that they do not suffer for the want of parents.

GYNECOLOGY AND ABDOMINAL SURGERY.

Disinfection of the Hands and Abdominal Skin before Operation.

—The solution recommended by E. McDonald (*Surg., Gyn. and Obst.*, 1915, xxi, 82) has the following composition: acetone (commercial), forty parts; denatured alcohol, sixty parts; pyxol, two parts. With this solution, in no case was any growth obtained after thirty seconds' immersion of hands previously infected with staphylococcus aureus and bacillus prodigiosus. Acetone may be best obtained from dealers in painters' supplies. It is used by them as a varnish remover. It need not be chemically pure. This solution contains a fat solvent, acetone, which causes the solution to penetrate. The alcohol is a good vehicle. It contains a strong germicide, twenty times as germicidal as carbolic acid in equal strengths and this germicidal value is not impaired by the alcohol or acetone. It thus has the germicidal value of phenol in 40 per cent. solution (if such a solution could be made), plus the germicidal action of the solvent. Pyxol is a dark liquid, extracted from coal-tar creosote, which forms a white emulsion with water and a light mahogany-colored solution with alcohol and acetone. Its germicidal efficiency is twenty times that of phenol. The action of pyxol is not impaired by pus, soap, serum and other albuminous matter. Pyxol is said to have the following composition: 40 per cent. pyxol oil, 30 per cent. neutral hydrocarbon oil and 30 per cent. saponified vegetable oil. It is said to be free from carbolic and cresylic acids. The neutral vegetable oils are present only as emulsifying agents. It is advised that the hands be disinfected before operation by immersion in this solution for one minute with the aid of a nail-brush and a gauze cloth. The solution is inexpensive, unirritating to the skin and efficient.

It may be used repeatedly. It will acquire a sediment of various detritus which in no way impairs its efficiency. In the sterilization of the skin of the abdomen, it is rubbed on for two minutes before operation after the patient is under ether without any preliminary washing. It speedily evaporates from the skin. Since it is possible to sterilize the hands so thoroughly and in such a quick and easy fashion, it does not seem to be any further advantage in using rubber gloves, for the hands can be resterilized after contamination in less time than it takes to remove the contaminating gloves and put on a clean pair.

C. G. McMullen (*Surg., Gyn. and Obst.*, 1915, xxi, 87) has used McDonald's solution in 276 major cases, practically all laparotomies or hernias. In emergency cases soap and water scrubbing of the operative field was dispensed with and only McDonald's solution used. In this series of cases there were seven skin infections, a percentage of 2.54. Excluding those cases in which infection was obviously due to some extraneous causes, there remain but three cases in which there was any skin infection, which might be attributed to improper disinfection of the skin. The writer believes it to be the most efficient method of skin disinfection at our disposal at the present time. Healing, under its use, seems to take place more readily than under iodine skin disinfection, wound repair being accelerated by at least three days.

E. MacD. Stanton (*Surg., Gyn. and Obst.*, 1915, xxi, 89) has used this solution with only two infections in 240 otherwise clean cases. One of these infections was definitely traced to an error in catgut preparation. The second occurred when half the nurses in training had septic sore throats. The author has never before had such rapid healing free from all evidence of chemical irritation.

Perinephritic Abscess.—In a review of cases operated upon at the Massachusetts General Hospital, fifty-nine in number, E. P. Richardson (*Surg., Gyn. and Obst.*, 1915, xxi, 1) says that the three principal points in diagnosis are continued fever, leukocytosis and abdominal or costovertebral tenderness. Very few cases show evidence of a metastatic hematogenous infection. Whether this is direct, or indirect either through metastasis in the fibrous capsule, or through rupture of a cortical abscess, is of small clinical importance, provided the possible coexistence of an imperfectly drained renal abscess is borne in mind. Without minimizing the importance of infection of the perirenal fat from a distance through the lymphatics and without implying the frequent participation of the kidney the writer calls attention to the following points: The commonest organism, the staphylococcus, producing "primary" perinephritic abscess is also the most frequent organism concerned in producing focal cortical abscess in the kidney. "Primary" perinephritic abscess occasionally follows peripheral pus foci. In such cases it is reasonable to suppose that infection has followed a metastatic hematogenous course. A urine normal on clinical examination does not exclude the possibility of cortical renal abscess. The previous occurrence of a peripheral pus focus due to the staphylococcus may

be of some importance in the diagnosis of continued fever with leukocytosis and lumbar or abdominal pain.

Cystalgia; Urethralgia.—Speaking of this syndrome, L. J. Roth (*Surg., Gyn. and Obst.*, 1915, xxi, 91) says that adults, women especially, between the ages of forty and sixty are those usually attacked. They may otherwise appear in perfect health. In a second category are young women, whose general conditions are perfectly normal, but in this class, like the previous one, they are all manifestly neurotic and the neurosis varies from a mild exhibition to a paranoic approach. In practically all cases the patients are unable to state a definite cause. The attack has come on quite suddenly, progresses rapidly to its height and continues chronically for several months with remissions. The interval between attacks is in some cases a year or longer. Several recurrences are noted in nearly all histories. In most cases the patients urinate more frequently during the day than at night, though the reversed condition may be seen, also the combination of nocturnal and diurnal frequencies. If the nocturnal variety obtains, the paroxysms begin usually at the same hour, and persist for intervals varying from one-half to one hour, and do not subside until early in the morning. During the day the frequency depends upon the amount of distraction. The spasmodically painful urinations are in large number if the patient is at home; the intervals may extend to three or four hours if the patient is on the street or shopping. As a class these subjects are very intelligent, refined and well preserved, calm as to outward appearances and martyrs on account of their pain. The pain is analogous to that of cystitis. The bladder and urethra either singly or combined become spasmodic and the contraction of the urethra may produce a state of retention with intolerable suffering. The pains occur with the bladder in any stage of repletion and are referred to the urethra, rectum, labia, or the lower vertebral region. These continue during the entire period of urination and may persist for a time following it. At this epoch the spasm may become clonic and the rapidly opening and closing sphincter, expelling successively a few drops of urine, adds agony to the already pain-racked individual. Relief is secured for a certain interval, only to be dispelled by a recurrence of the tenesmus as soon as the exciting quantity of urine reaccumulates. In some cases the urinations are almost continuous. A succession of spasms occur, the patient voiding only a few drops of scalding fluid. Cystoscopy shows always a congestive trigonitis and cervicitis and the urethra frequently shows hemorrhagic patches and granulations, with the presence of an occasional caruncle, papillary growth, or fissure. This latter is probably traumatic and possibly produced by a too strenuous examination made previously. The vesical mucosa and musculosa is in keeping with the general senile changes. From time to time apparent deformities are noted, but these are produced by minor distention of the bladder. The body or cervix of the uterus may cause heavy projections at the summit, but these for the most part may be made to disappear by introducing more fluid into the bladder, if the uterine mass is not too enlarged or not much adherent.

In several cases with marked anterior colpocele nothing of importance was found save an extension of the congested area and moderate bladder deformity. In one a very tender cicatrix, the result of repair of a urethrovaginal fistula, was undoubtedly the cause of the urethralgia. The writer's investigations have led him to believe that the condition is a neurosis of reflex origin, the exciting cause being continuous with the bladder or contiguous to it. The theory is founded upon the fact of the composite innervation of the bladder, urethra, anus, rectum, and uterus by the sacral and coccygeal branches with the pelvic sympathetics. That the bladder is not the primary cause is proved by the absence of cystoscopic and urinary findings, except those mentioned above. It is evident that in each case a proper diagnosis must be made and suitable therapy instituted, medically, surgically and psychologically. The majority of these cases can be cured.

Appendicitis Pointing in the Left Flank.—R. Proust and Jean Paris (*Rev. de gyn. et de Chir. abdom.*, Aug., 1914) say that pain localized in the left flank may be used as a diagnostic sign of appendicitis under certain circumstances. The authors give the history of a case in a child in which the inflamed appendix had ruptured into the general peritoneal cavity, and in which the pain localized in the left side enabled them to operate in time to save the life of the little patient. The rupture had occurred five or six hours before the operation, and the characteristic signs of peritonitis had begun in the left iliac fossa, while there was free fluid in the rest of the peritoneal cavity. The anatomical arrangement of the pelvic colon is such that there is a tendency for the pus to rise upward into the left iliac region and thus reach the general peritoneum. Here a sudden pain in the left side indicates its irruption into the peritoneal cavity. Thus left-sided pain may show the existence of an appendicitis on the right side through its invasion of the general peritoneum. The temperature curve by its sudden rise also indicates the occurrence of this condition as does vomiting. This condition has been recorded by several other authors, but does not seem to be generally recognized. Pain in the left side indicates an advanced condition with rupture of the appendix and the invasion of the abdomen by pus.

Restricted Hysterectomy Completed by Radium Therapy in Cancer of the Uterus.—S. Pozzi and G. Rouvier (*Rev. de gyn.*, vol. xxiii, Nr. 3, June, 1915) say that there are two opposite opinions with reference to the extent of the operation for the removal of cancer of the uterus. One party follows Wertheim who advocates a very wide removal of all the surrounding tissues, with the idea of removing all possible infected tissues; the other party uses a restricted operation and applies radium or mesothorium to the seat of operation to destroy all remaining cancer cells. Döderlein believes that gynecology will be reduced in the near future to the use of radium in cancerous cases. The operation of Wertheim will always remain a very serious operation. One of its dangers is the wounding of the ureters and bladder. It is done frequently in patients who are septic, anemic, and exhausted by repeated hemorrhages and must be

serious for this reason alone. It must always remain incomplete no matter how much tissue is removed, for it has been shown that in the tissues remaining there are often nests of three or four cancer cells which will continue the spread of the disease. In the application of radium to cancer we have seen immediate relief of pain and obtained cicatrization of ulcers. But this is only temporary benefit, because the tumor masses are too thick to be affected throughout by the applications, and the method of application must vary with each case treated in order to be thorough. New technic has rendered the applications of radium more effective. It has been used before operation to modify the masses present and render operation easier. The author applies the radium after operation to prevent recurrence. For this purpose it cannot be applied too soon after the operation. It should be used at the end of the operation while the pelvis is still open, the radium tubes being placed in meshes of gauze in the dressings. A careful filtration of the rays must be used in order to prevent the causation of necrosis of the remaining tissues. The operation thus restricted will be much less dangerous than the Wertheim operation. The author gives the technic of his operation in detail, and the histories of eight cases operated on. His conclusions are as follows: In spite of the diminished mortality by the Wertheim operation and the increased limits of operability created by it, with a considerable number of survivals without recurrence, nevertheless arrest of evolution and cure have been obtained by the use of radium with restricted hysterectomy, when radium was employed in large doses and properly filtered. At first applied in inoperable cases, then in operable cases to remove the necessity of operation, radium is now associated with surgical removal of the growth to prevent recurrence. The results of radium so used are sufficiently good and the immediate dangers of hysterectomy with the enlarged operation are great enough to justify a restricted operation followed by radium application. The author prefers vaginal hysterectomy because it is more benign in its results.

Destruction of Cervical Mucosa in Subtotal Hysterectomy as a Cancer-preventing Measure.—In 123 replies to an inquiry by G. T. Tyler (*South. Med. Jour.*, 1915, vii, 583) as to the treatment of the cervical mucosa in subtotal hysterectomy, it was shown that 22 per cent. excise the mucosa, 13.5 per cent. use the cautery, 3.4 per cent. excise or cauterize the mucosa, 3.4 per cent. prefer total hysterectomy in all cases, 12.7 per cent. use carbolic acid or iodine, 1 per cent. curets, and 44 per cent. do nothing to the mucosa. The writer urges that a careful visual examination of the cervix be made before operation, and that operation be undertaken with the idea of preventing malignant degeneration of the cervical mucosa. Total hysterectomy, complete excision or cautery to include the *portio vaginalis*, are most likely to prevent cancer. Destruction of this portion of this canal can also be done by the extension of Hunner's method for curing leukorrhea, or by a modification of Percy's method.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

DEVELOPMENTALLY DEFICIENT CHILDREN TWICE BORN TO SAME COUPLE.

BY

WENZEL C. GAYLER, M. D.,

Visiting Gynecologist to St. Louis City Hospital.

(With two illustrations.)

JAN. 1, 1914, Mrs. P. was delivered of a male child, at term, weight 7 pounds, and normal in all respects with the exception of an imperforate anus and complete absence of the rectum. It lived twelve days with an artificial anus.

Jan. 3, 1915 she gave birth to an anencephalic monster (female) pictures of which accompany this paper. It was five weeks premature but seemed in other respects normal. There was a tremendous quantity of amniotic fluid, as is usually the case with anencephalic children. It died immediately following the artificial rupture of the membranes, about two hours before its birth.

Mrs. P. is a fairly developed woman of twenty-three years, about 5 feet 2 inches high, weighing 115 pounds. She is a trifle below the average intelligence, but physically perfect as far as I could determine. She showed no evidence of tuberculosis, rachitis or syphilis. She refused the Wassermann test. As far as I could determine by examination both during and after pregnancy her pelvic organs are normal. She was born on an Illinois farm of English parents, and leads the simple life of her class. She washes, irons and cooks for her husband and for herself. She does not use alcoholics.

The father of these children is a powerful railroad switchman aged twenty-eight, who shows no evidence of alcoholism, rachitis, tuberculosis or syphilis. He refused the Wassermann test, and claims to drink beer in moderation. He had gonorrhea once, several years before marriage, and was born in St. Louis of German parents.

Mrs. P.'s mother died many years ago of tuberculosis. Her father

is living and drinks whiskey to excess. I have every reason to believe, however, that he did not drink previous to six years ago. He has been on a farm all of his life, and during his youth was a very temperate man.

Both of Mr. P.'s parents are alive and in good health. They never used strong alcoholic drinks.

Neither of the two parents, and none of the four grandparents have had any defects of development. There is not even a tradition



FIG. 1.

in either family, of any of its members having had the common deformities, such as polydactylism or harelip.

They had only been married one year at the time of the first delivery. Mrs. P. had therefore never been pregnant before, and of course had never had a miscarriage or abortion, thereby disturbing her power to produce a normal child, and to carry it a normal length of time. There is no history of trauma to the mother during either pregnancy.

A history of alcoholism in one of the grandparents, or in one of the parents, to which some authors(1) attach so much importance, seems entirely absent. (I am convinced that the maternal grandfather did not start drinking till his daughter was a grown woman.) Syphilis seems also to have been absent, although I could not exclude it with precision. As it is nowhere claimed, however, that these monsters are caused by syphilis, this lack of the Wassermann test does not seem important.



FIG. 2.

If we exclude as etiological factors (1) diseases of the embryo (collection of fluids in body cavities); (2) deformity caused by the cord or by a second fetus; (3) trauma to mother's abdomen; (4) amniotic bands, or abnormally small amniotic cavity, all of which are singularly absent in this case, then Ballantyne divides the remaining cases into two groups. The first group comprises the families in which developmental defects appear generation after generation. The last group, to which this couple seems to belong, is one in which

there is "partial interference with the reproductive powers of one or both parents," as in the interesting cases of (2) Davis, (3) Ballyntine, (4) Burnet, (5) Wilder and others, whose patients bore normal children, *then* aborted, after which their ability to bear normal children seems to have been destroyed. They then repeatedly bore monsters of various kinds, especially the anencephalic variety.

Just why this young couple, which seem so well suited for breeding purposes have an "interference with the reproductive powers of one or both parents" I cannot say.

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4. Wilder. *Science*, N. Y. and Lancaster, Pa., 1909, xxix, 429.
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WALL BUILDING.

TRANSACTIONS OF MEDICAL SOCIETY OF THE STATE OF NEW YORK.

SECTION ON PEDIATRICS.

109th Annual Meeting, Held in Buffalo, April 26-29, 1915.

JOSEPH ROBY, M. D., *of Rochester, in the Chair.*

FURTHER EXPERIENCE IN THE TREATMENT OF HYDROCEPHALUS BY CISTERNA-SINUS DRAINAGE (AUTHOR'S OPERATION).

DR. IRVING S. HAYNES read this paper. He stated that in October, 1912, he proposed drainage of the cerebrospinal fluid directly into one of the cranial sinuses for internal hydrocephalus. His first attempt resulted in an incomplete operation. A second trial secured connection between the cisterna and the occipital sinus. This functionated for only a short time. The conception that the cerebrospinal fluid should be drained into the blood stream was original with him and based upon the known fact that this was the course the fluid normally took. Searching the literature Dr. Haynes had found that Gärtner, in 1895, and Payr, thirteen years later, had worked out a complicated technic to accomplish this object. Notwithstanding these facts the operation which the author had devised was so much simpler than that of Payr that he had ventured to offer it to the medical profession. In discussing the etiology of hydrocephalus the writer stated

that hydrocephalus might result from an overproduction of fluid, from diminished absorption of the fluid from the subarachnoid space, from obstruction to the normal outflow through the vein of Galen, or to an obstruction to the flow of the fluid from the lateral ventricles through the central channels of the brain into the great subarachnoid space—the cisterna magna. The majority of cases fell under this latter division. The experiments of Dandy and Blackfan by means of phenolsulphonaphthalein indicated that absorption was by a general diffuse process involving the capillaries in the entire subarachnoid space. By capillaries they must refer to those in the pia. They found no evidence of a current flowing into the sinuses, but that the fluid did reach the blood stream in these channels was evident. The phenolsulphonaphthalein test afforded a ready means for determining if there was a free communication between ventricles of the brain and the spinal subarachnoid space. It would also aid in determining whether the obstruction to the absorption of the cerebrospinal fluid was in the route from the ventricles to the spine or lay in a diminished capacity of absorption in the subarachnoid space itself. Further aid in locating the obstruction might be afforded by the history of the case.

The author called special attention to the state of the optic nerve. In his twelve cases only two had vision and this was far below par. Optic nerve atrophy was present in every case examined with reference to that point, and every case without exception had more or less gastric disturbance. This finally proved fatal in several instances. The reasons why the cerebrospinal fluid should be directed into the blood stream had been stated in the author's former paper. This method was not applicable to cases in which the obstruction was above the aqueduct of Sylvius, but for the usual types of obstruction of the exits from the fourth ventricle with its consequent distention, or to failure in the absorptive capacity of the subarachnoid tissue this method seemed particularly adapted. The object was to drain the fluid from the hydrocephalus cavity at the base of the skull into one of the easily accessible sinuses, the lateral, occipital if it was large enough, or into the torcular itself. For this purpose a small silver cannula 1 to 2 mm. in diameter, having a short arm about $\frac{1}{4}$ inch in length and a long arm 1 to 2 inches long bent at right angles to one another, was used. In doing the operation a semilunar flap, 3 inches in length, was turned off the occipital bone so as to expose it from halfway between the inion and foramen magnum to the lower part of the posterior fontanelle. A $\frac{3}{8}$ -inch trephine hole was made at the lower part of the field and from this a gutter was cut upward into the bone from $\frac{1}{2}$ to $1\frac{1}{2}$ inches wide until a large sinus was exposed. A sinus could be identified by its dark color and proven by a hypodermic needle. Pressure sometimes displaced the sinus upward. Then the point where the cisterna was to be tapped was determined, a hypodermic needle being used for this purpose. When located, a suture of silk was passed. With a narrow knife an incision was made into the sinus vertically and the long arm of the cannula inserted into it. This should be fitted so tightly that there

was no leakage of blood around the tube. The dura (and arachnoid with pia if present) was incised so that the cerebrospinal fluid flowed freely. Into the incision in the middle of the square marked off by the suture the short end of the tube was inserted and the suture tied over it. This held the cannula in place. Care in suturing to prevent leakage was important. Dr. Haynes reviewed his series of cases and suggested another method of drainage when the obstruction was in or above the aqueduct of Sylvius. Some of his cases had shown improvement but he did not consider the record very encouraging so far as cure was concerned. He demonstrated the operation by lantern slides.

DR. GODFREY R. PISEK, of New York, said: It must not be forgotten that the cases upon which Dr. Haynes had operated were surgical experiments. It seemed not unreasonable to hope that if they saw cases of hydrocephalus early in the course of their development and made the test with phenolsulphonaphthalein to see what that showed in reference to the lesion, and could thus learn something of the type of cases with which they were dealing, this method of drainage offered some hope. Again if they got the cases before the mentality was seriously affected, especially cases that were complications of other conditions, there might be some hope from an operation of this kind, and so he did not share the extreme pessimism that Dr. Haynes had expressed.

The technic of the operation was not simple and only a surgeon skilled in brain surgery should attempt to do it.

DR. CHARLES W. HENNINGTON, of Rochester, said that the operation which Dr. Haynes had presented was in line with the laboratory work of Cushman. His pathological studies showed the absorption of tufts and villi into the longitudinal and other sinuses of the head and it seemed that this operation offered the solution to the problem whether it might not be better to make the communication between the dura and arachnoid and puncture from the reverse side. The speaker agreed with Dr. Pisek that if these cases of hydrocephalus were brought to the surgeon earlier and the eyes were examined first and the phenolsulphonaphthalein test applied to determine the type of obstruction there might be some hope of relief for them. If there was deficient absorption then Dr. Haynes' operation was in order. If there was obstruction why not puncture the ventricle through the corpus callosum? This would remain open if there was actual obstruction in the ventricle and would allow the ventricular drainage to find its way into the cisterna. Dr. Haynes' operation and this one might be combined successfully.

DR. HAYNES said the phenolsulphonaphthalein test had been used in this way since he had been doing this operation and he had not had the opportunity of testing it out in all his cases. This suggestion made by Dr. Hennington might offer hope of relief if the obstruction was above the aqueduct of Sylvius. The technic for this procedure would be easy. One might thrust one end of a rubber tube into the ventricle and the other into the lateral sinus. Dr. Haynes said he had gone into this work with great enthusiasm, but if one could not

improve to any extent the mental or physical condition of these children he did not think it was accomplishing a great deal to simply prolong life. He was very glad to hear the opinion expressed that the operation might be developed into something of practical benefit.

THE SCHICK REACTION AND ITS PRACTICAL APPLICATION.

DR. ABRAHAM ZINGHER, of New York, read a paper in which he presented results which were confirmatory of those previously published by Dr. William H. Park and himself, and from which the following conclusions were warranted: 1. The Schick reaction served as a reliable and convenient index of the susceptibility or nonsusceptibility of individuals to diphtheria. 2. It served also as an acute clinical test to determine the efficacy of active immunization with mixtures of toxin and antitoxin. 3. It had helped them in the diagnosis of clinically doubtful nasal diphtheria. With purulent or sanious discharge showing the Klebs-Loeffler bacillus it was difficult to decide whether the case was a carrier or a beginning diphtheria. A negative reaction excluded clinical diphtheria, while a positive Schick reaction left the diagnosis of clinical diphtheria still a probability. 4. It had added further experimental proof to the clinical experience that very toxic cases of diphtheria required the early intravenous administration of large doses of antitoxin. 5. The results obtained in families seem to point to other causes in addition to bacterial infections with virulent diphtheria bacilli as determining factors in the production of natural antitoxin.

RESULTS OF THE SCHICK TEST AT THE ROCHESTER ORPHAN ASYLUM.

DR. STERNS S. BULLEN, of Rochester, said that in May, 1914, 132 children were given the Schick test and 100 of the same children were again tested in April, 1915. The toxin was diluted with normal saline so that the required amount, one-fiftieth of the lethal dose for the guinea-pig, was contained in 0.2 c.c. The children submitted to the test ranged from six months to seventeen years in age. The children were not allowed to see the syringe or watch preparations and they had been able to make the injections painlessly. This was a matter of considerable interest to the patient. Of the 132 children, 56 per cent. had at least one-thirtieth of a unit of natural antitoxin. The remaining 44 per cent. had less than this amount and would probably have been susceptible to the disease. After the tests were made a small supply of toxin antitoxin was obtained from the New York City Department of Health and an attempt was made to actively immunize the susceptible children. Forty-one children showing strong positive reactions were given $\frac{1}{4}$ c.c. of the toxin-antitoxin mixture, subcutaneously, on two occasions, with a four-day interval. Of this number thirty-five were in the institution in April, 1915, and were again tested. All except eight, 77 per cent., still had strongly positive reactions, showing that they had developed very little if any antitoxin as a result of the treatment. The group of 100 children

remaining in April, 1915, were again tested. Forty-five showed more or less strongly marked reactions, while fifty-five gave no reaction. Eighteen who showed positive reactions on the first test now gave no reaction. Included in this number were the eight cases mentioned as having developed immunity as a result of the treatment with the toxin-antitoxin mixture. On the other hand fifteen children that at the time of the first test gave negative reactions now gave positive reactions. A girl of nine years in November, 1914, developed diphtheria who had the preceding spring given a negative reaction. She was given a curative dose of antitoxin and then another Schick test. The toxin of this was neutralized by the antitoxin and a negative result was obtained. In April, 1915, she also reacted negatively to the Schick test. At this time three other children gave positive throat cultures, but no clinical manifestations of diphtheria. These cases all reacted negatively to the Schick test. These were considered to be merely carriers and no antitoxin was given. This series was not large enough to warrant the drawing of conclusions, but it illustrated that positive or negative results with this test did not give us data which remained the same for an indefinite period of time. By combining the Schick test and throat cultures one was enabled to single out the carriers. None of the 232 injections gave any bad results. It would seem that in the presence of an epidemic the Schick test should be repeated once a month for the purpose of singling out carriers as in this way an epidemic of diphtheria in an institution could be controlled at a much reduced expense for antitoxin and much less discomfort to the children.

DISCUSSION ON SCHICK REACTION.

DR. GODFREY R. PISEK, of New York, said that Dr. Zingher had well summarized the principles of the Schick reaction but it was worth while emphasizing certain particular features. What would probably happen was that the pendulum would swing the other way; now there was a great deal of enthusiasm but there would be those who would negative the value of this test. By an imperfect technic and improper preparations of toxin they would get results that were of no value. To avoid this possibility no one should administer the Schick test unless he had practical knowledge of the procedure by direct contact. It was not always easy to distinguish the true from the pseudoreaction without experience in the observation of both reactions. It was also important not to make deductions from a small number of cases. Dr. Zingher could make deductions from his 600 cases, and what he stated could be affirmed to be of distinct practical value. They would reap benefit from this test in various ways, *e.g.*, it had taught them that the tremendous doses of antitoxin, 30 to 60,000 units, which were sometimes used were unnecessary. In the Willard Parker Hospital every child entering the scarlet-fever ward was formerly given an immunizing dose of antitoxin and he had done the same thing in his Babies' wards; now he used the Schick reaction and found those that had natural immunity.

Those only that were negative were not given the antitoxin. The presence of scaling and the secondary areola should be kept in mind in distinguishing the true from the false reactions.

DR. CHARLES HERRMAN, of New York, said the Schick reaction had proved itself of great practical value, especially in institutions such as schools, asylums and hospitals. They had recently had several cases of diphtheria in the children's ward of the Lebanon Hospital; one patient died. Cultures were made from the nose and throat of nurses, physicians and patients, and seven nurses, one physician and several children, were found to have positive cultures. The Schick test was applied to all the nurses and patients in the wards in which positive cultures were obtained and all those who gave a positive reaction were immunized. Only those nurses who had a negative Schick reaction were allowed to attend patients who had a positive culture. In this way the further check of the disease was prevented. In addition to the value of the reaction in the selection of patients requiring antitoxin in ascertaining the proper dose of antitoxin to be given and in determining the relative value of the different methods of application, Dr. Herrman mentioned two other ways in which this test would prove useful. It was well known that patients with measles were especially susceptible to diphtheria and that it was apt to be more malignant in them. On that account in many institutions all such patients were immunized. This reaction made it possible to pick out the susceptibles and also to determine when they required a reinjection. Many observers had obtained good results in the treatment of postdiphtheritic paralyses with antitoxin; others claimed that as the toxin was inseparably bound to the nervous structures it could not be of any value. In those patients who gave a positive reaction the administration of antitoxin would certainly be indicated. The fact that over 90 per cent. of the new-born gave a negative reaction showed conclusively that immunity could not be due to previous exposure or infection in all cases and that the new-born might possibly be able to elaborate its own antibodies.

With reference to the treatment of scarlet fever with convalescent blood, Dr. Herrman said that the treatment was based on the fact that a person who had had an attack of the disease was usually immune. The blood in all probabilities contained antibodies against the disease. However, it did not necessarily follow that blood which contained sufficient antibodies to protect against future attacks would also give a specific effect upon the disease when it was already present. First, there was the quantitative difference; the body of the person convalescent from scarlet fever who was immune contained from fifteen to twenty times the amount of blood which they injected into the patient with scarlet fever. This might not be of such great importance. They knew that sera which had a specific effect were produced in the diseases caused by a bacillus which developed antitoxin. They did not even know whether scarlet fever was caused by a micro-organism. There was no doubt that the convalescent blood had a distinct and apparently favorable effect on the temperature. The

charts published by Rees and Jungman, by Koch, and those exhibited by Dr. Zingher showed this; the general condition of the patients seemed to be improved; but these authors admitted that complications were not prevented and that when they occurred there was a new rise in temperature. They agreed that the difference between the action of convalescent serum and normal blood serum was simply a quantitative one; that was that it was not specific. In view of the fact that complications were usually due to secondary infection with the streptococcus, it would seem logical to combine the convalescent blood with Moser's serum. Dr. Herrman said it appeared to him that they should not be able to obtain a definite idea of the value of this method of treatment until the disease could be successfully transmitted to animals. A few investigators had already met with some success in this direction. If not of great curative value it might still be of some aid in prophylaxis.

DR. ABRAHAM ZINGHER said he had been using the Schick test for about a year and a half and had applied it in from 4 to 5000 cases. The toxin had to be properly made, properly diluted, and injected into the proper place. For uniform results one must use a certain technic and properly prepared toxin. A negative reaction meant the presence of antitoxin in the blood of the individual. The speaker said he had never seen a positive reaction change into a negative one except in young infants. The reaction was certainly of great value in institutions as when inmates were found with a negative reaction it was unnecessary to give them antitoxin and this was a great saving. They knew in the negative cases that the individuals were immune to diphtheria, and if complications arose in the course of other disease that might suggest diphtheria, if the patient gave a negative Schick reaction they knew that the complication was something else than diphtheria. Only nurses giving negative reactions were permitted to care for diphtheria patients. In the Infant Asylum, among babies that gave a negative test, several developed croup but they assumed that they did not have diphtheria and the symptoms immediately cleared up. They had had a simple laryngitis, and the Schick reaction had saved the administration of antitoxin. In a family in which an older child had diphtheria one might be very sure that the younger children would give a positive Schick reaction.

DR. JOSEPH ROBY, of Rochester, said that the statement had been made by Dr. Zingher that he had not seen any positive reaction become negative unless the toxin antitoxin mixture was given.

DR. ZINGHER said that at about the first year of life 50 per cent. of the children showed a positive reaction while from two to five years about 67 per cent. were negative and as the children grew older the percentage of positive reactions decreased, but in the adult if the reaction was positive it remained positive and if negative it remained negative.

DR. ALBERT D. KAISER, of Rochester, at Dr. Roby's request reported the case of a child vaccinated against smallpox on Easter Day. The vaccination took well but became infected and erysipelas developed. The child received antistreptococcus serum and leuko-

cyte extract. At the same time they had in the hospital a woman who had had a second attack of erysipelas and was making a very quick recovery from it. They took blood from this convalescing erysipelas patient, citrated it, and gave the child an intramuscular injection. This had been done the day before and to-day the child was much better. He thought this was the first time such an injection of convalescent blood had been given in a case of erysipelas.

DR. ZINGHER said the usefulness of injections of blood was not limited to convalescent blood in scarlet fever, but was applicable to hemorrhages of typhoid fever and some other conditions and in marasmus. He thought the injection of blood from the convalescent erysipelas patient might be of benefit in this particular case, but not necessarily in every case, because in this case there was an accumulation of antibodies.

CHARLES HERRMAN, M. D., read a paper on

IMMUNIZATION AGAINST MEASLES.

The number of cases of measles remains as great as ever. It can only be diminished by immunization against the disease. From 1900 to 1910, in the registration area of the United States 44,080 deaths from measles were recorded. In New York City in 1913, 628 deaths were due to measles, 507 to scarlet fever, and 420 to whooping-cough. In addition many patients die of the complications, others are permanently injured. Ninety-five per cent. of the population are infected with measles at some time during their life. Infants under five months are relatively immune, and in the exceptional cases in which they are infected, the disease appears in a mild and atypical form. Artificially fed as well as breast-fed infants are immune. Infants under five months who have come in intimate contact with a case of measles and have not been infected, frequently do not contract the disease when exposed in later life. One attack of measles usually protects for life. The nasal discharge contains the virus twenty-four hours before the appearance of the eruption. Having convinced myself from a very large series of personal observations that infants under five months are relatively immune, I obtained the consent of a mother to inoculate her infant then four months old, explaining that the object was to render it immune against measles in the same way that vaccination protected against smallpox. It seemed logical to assume that as the infant at that age was not *absolutely* immune, direct inoculation would convert a temporary into a more or less permanent immunity. At no time did it present any evidence of injury; and I therefore proceeded cautiously to immunize others. The material for inoculation was obtained from otherwise healthy children, *taken twenty-four hours before the measles eruption appeared*. A small quantity of mucus from the nose was collected on swabs of cotton. Only perfectly healthy infants under five months were inoculated. The swab was applied gently to the nasal mucous membrane. Forty infants were inoculated. The majority of the infants showed no distinct reaction, fifteen had a slight rise of tempera-

ture, and in a few instances a small number of spots was noted on the face or body. Of the forty cases inoculated, four over one year of age have since come in intimate contact with cases of measles and have not contracted the disease. Having satisfied myself that those infants who had been inoculated were immune, two of the forty were reinoculated at the age of twenty-one and twenty-three months respectively with negative result. It has been shown that the virus of measles is filterable, so that the use of the filtrate would naturally suggest itself, but I believe that the filtrate cannot be depended on for the purpose of immunization. It would be desirable to devise some method by which the virulence of the infectious material (mucus) could be retained for more than twenty-four hours.

PYELITIS: ITS CLINICAL SIGNIFICANCE.

DR. EDWARD JUDSON WYNKOOP, of Syracuse, said that it was not that pyelitis was such an important disease that the subject was brought to their attention, but that in many instances it occurred unrecognized and might complicate many of the ordinary children's diseases. The failure to recognize and properly treat a case of pyelitis might cause considerable permanent kidney damage. The recognition of a well-defined ordinary case was not so difficult, but when atypical symptoms presented themselves an early diagnosis might be a matter of some difficulty. Pyelitis was considered a disease of infancy and childhood; the most common age was supposed to be under three years. It was much more frequent among girls than among boys. This, of course, was to be expected when one considered how much easier was the chance of infection of the genitourinary tract in girls. It was supposed that most of the infection occurred through the urethra and bladder. However, many cases occurred through the infection being carried by the blood through the intestinal tract. The most frequent cause was infection with the *B. coli communis*, though it might be caused by any of the infectious organisms. Pyelitis might complicate the infectious disease or might occur as a primary disease. With pyelitis the bladder might be inflamed, but cystitis was not necessarily an accompaniment of the disease.

Fever was usually present and the occurrence of a high fever with remissions to the normal without assignable cause should favor a diagnosis of pyelitis. A chill usually ushered in the attack but though the fever might resist for some days there might be no recurrence of the chill. Chills might be absent and the fever low. However, the chills might recur during the attack, especially at the beginning of a relapse. It was quite usual for the fever to be fairly high for several days, then drop to normal and remain there a few days only to go up again suddenly. Fever might not always be present. This irregular fever was very characteristic of the disease. Pain was present in a certain number of cases, resembling in many cases intestinal colic. It might be referred to the kidneys or bladder; many times the location was hard to determine. In a fair proportion of cases it was possible to obtain a history of pain referable to the act of micturition.

Anemia was practically always present. A marked leukocytosis was always present in pyelitis but only slightly so in cystitis. In many cases the ordinary features of the urine were overlooked and without a chemical and microscopical examination the symptoms might entirely escape notice. Careful microscopical examination of the specimen of twenty-four-hour urine was the only way of reaching a definite conclusion. It seemed to the writer that when a pyelitis persisted, unrecognized and untreated for some time, relapses were very common and the pyelitis was very stubborn in resisting treatment. The fact should be borne in mind that when there were symptoms of intestinal disturbance, irregular fever, and variable appetite, it was well to suspect pyelitis and to make a careful urinary analysis. It was well to remember that there were other organs besides the stomach and intestines that might cause trouble. The disease should receive more attention for according to the experience of the author the prevalence of pyelitis was far in excess of what they had been taught to believe.

Urotropin and potassium citrate were probably the most used remedies. Personally the author preferred potassium citrate as in his hands it had proved more effective. Plenty of water should be given and attention should be paid to general hygienic measures.

DR. WALTER LESTER CARR, of New York, agreed that in most instances pyelitis was an infection of the colon bacillus type, but the peculiarity of the invasion required some consideration as it did not always seem to be associated with intestinal disturbance that attracted attention, nor did it always show itself after a colitis, of which there was a record. According to his own observations many of the cases were seen after influenza, and yet the cultures of the urine showed pure colon infection. Kelly and Burnham believed that the common origin of pyelitis was through the blood stream and that ascending infection was rare. There could be no doubt of the preponderance of cases in females, but careful observation for the past few years had shown that there were more cases among males than had formerly been noted. As these male cases could hardly come from an ascending infection so frequently ascribed to the female children, it would seem wise for them to study more carefully the influence of the blood-stream infection. Of course, they had a small number of cases of pyelitis due to stone in the kidney or other mechanical causes.

Dr. Carr expressed the opinion that they were getting satisfactory results in the treatment of pyelitis, both by the free use of alkalies and by urotropin, but he was a little in doubt as to the end results in these children. He believed that the only way to record them properly was by examination of the urine, extending over a prolonged period. He was suspicious that there might be reinfections or reinvasions. Naturally the care of the intestine was of the greatest importance, both during acute pyelitis and in the intervals between the attacks. During the acute process Dr. Carr used intestinal irrigation and such laxatives as he felt were called for. The elimination of milk from the diet if there was constipation or foul

stools was most important, and the administration of castor oil at such times was unquestionably of benefit.

Regarding the use of vaccines he had not yet determined their full use, although they would without question limit some of the symptoms of infection. Pyelitis was so erratic that it was often difficult to determine the effect of any particular form of medication.

In closing, Dr. Carr urged upon all practitioners more careful routine examination of the urine in infants and young children who had intestinal disturbance, fever and prostration.

THE REMOTE EFFECTS OF BAD FEEDING.

DR. FRANK VAN DER BOGERT, of Schenectady, declared that more and more importance was being attached to the part played by the gastrointestinal tract in the production of ill health. Delicacy, lack of vigor, wasting, muscular weakness and incoordination, might all be definitely attributable to lack of nourishment due to inability to digest and assimilate and to imperfect metabolism. Most of the functional disorders of childhood were now recognized as dependent upon gastrointestinal toxemia. Educators at school were beginning to realize that naughtiness at school was an indication of disturbed health. The influence of autointoxication in the production of certain vascular and functional disturbances of the eye was now a certainty.

Dr. van der Bogert presented records of 200 consecutive cases taken from his case records in which he had the later dietetic history of the children and also the dietetic history during infancy. Of these 200 cases, all of course sick children, seventy-seven or 38½ per cent. had been nursed for one year or longer. Of these seventy-seven, sixty-six showed chronic symptoms of indigestion and forty gave evidence of toxemia including perverted appetite, disturbance of sleep and functional nervous disorders, including chorea.

In a paper read before this Society last year the writer had endeavored to show some connection between growth and recurrence of adenoids and a bad dietetic history and it was suggested that too long nursing was a factor. A study of the records indicated that of sixty cases showing adenoids, twenty-four or 40 per cent. were prolonged nursers. Of fifty-five cases of urinary incontinence, seventeen or 31 per cent. had been nursed a year or longer. Prolonged nursing usually meant carbohydrate excess, since the nursing was in addition to other feeding, usually between meals and at night. More than 50 per cent. of the cases admitted gross errors of diet in later childhood.

The apparent effect of these errors were discussed in three groups, those dependent upon proteid excess, those apparently due to excess of fat, and those which might fairly be attributed to excess of carbohydrate. The latter appeared to be the most common in childhood. As far as could be learned proteid excesses were rare; in this series only two could be considered excessive meat eaters and only two apparently consumed excessive quantities of milk.

Although the dietetic histories of only fifty cases showing marked reactions for indican in the urine were studied, it seemed safe to conclude that the presence of large amounts of indican were not indicative of any specific dietetic disturbance. The excess of indican seemed to originate in decomposition of proteid matter and the condition seemed to be protein intolerance brought about by digestive catarrh, rather than proteid excess. Certain skin lesions such as urticaria and eczema appeared to be associated with indicanuria and might possibly be dependent upon the toxemia of proteid decomposition.

The result of the ingestion of large quantities of fat was more evident in infancy than in later childhood, when they were manifested in conditions conceded to be due to acidosis and the effects of excess directly upon the digestive tract.

It was the carbohydrate excesses with which they had chiefly to deal since it was so difficult to control them. Of these the writer treated at length, again emphasizing the association of bad dietetic history with the presence of adenoids and enlarged tonsils. He declared that the invariable history of gross dietetic history in these children could not be disregarded. Of the sixty adenoid cases in his series over 58 per cent. gave such a history. Urinary incontinence was frequently associated with carbohydrate excess; thirty-eight out of fifty-five cases, or 69 per cent. had been consuming large quantities of sugar and starch. Indican was present in only thirteen out of fifty-five cases of enuresis. Of ten cases of enuresis in which stool examinations were made eight showed undigested starch. The exudative and lymphatic diatheses, though no doubt to an extent congenital, were undoubtedly due to the inability of the body to utilize the necessary elements of food or upon faulty metabolism.

Cases of scarlet fever and measles which he had seen terminate fatally were almost without exception badly fed. The influence of diet upon the outcome of whooping-cough was also important. The practice of feeding children immediately after they vomited was exceedingly bad.

DR. HENRY L. K. SHAW, of Albany, laid stress on what had been said in reference to indican. He did not now attribute much importance to indican nor did he think that it had any special significance. Enuresis did not seem to have any definite relation to indican or to diet. A great many children use carbohydrates to excess and without any bad effects; they did not seem to suffer from any of these ills. The remote effects of feeding fats were known to all. Eczema did not seem to be due to any one food element but rather to overfeeding, and when this affection was present one should cut down the amount of food.

Again, he could not agree as to the effect of diet on the mortality of scarlet fever and measles. In whooping-cough it had been his practice to feed up the children. Perhaps a good deal of the vomiting of whooping-cough was due to the giving of

nauseating drugs. He advised the giving of mixed pertussis serum if an epidemic threatened. They did this at St. Margaret's Hospital in Albany and of nine children who were exposed none took the disease. They did not put so much emphasis on the diet but gave the children plenty of fresh air. It was well to discuss this paper for he felt that they could not say that everything was due to improper feeding.

DR. THOMAS S. SOUTHWORTH, of New York, said that with reference to prolonged nursing as a cause of adenoids, it was interesting to relate that Dr. Haskins yesterday read a paper before the Section on Eye, Ear, Nose and Throat, in which he took the position that the absence of adenoids among the Apache Indians was because these mothers nursed their babies so long. He held that this prolonged nursing helped in the development of the nose, teeth and upper jaw. This was a new idea, since most of them had the impression that prolonged nursing produced the results that Dr. van der Bogert had ascribed to it. He would have laid more stress on the part played by the fats than Dr. van der Bogert did. When an older child was taking milk but was cloyed by the fats, skimmed milk might be given, or the milk might be omitted from the diet altogether. The reader of the paper spoke of meat as a cause of indicanuria and that indicanuria was only the indirect result of other processes and not directly due to excess of proteid, but did not say anything about egg as a cause of putrefaction and of indicanuria. He had found in several instances that by eliminating egg from the diet he had overcome to a large extent these undesirable conditions.

DR. DEWITT H. SHERMAN, of Buffalo, thought it not wise to assume there was no gross excess of any one element but that a condition was due to taking too much of all elements; by feeding each one of the articles of diet for a while one would be better able to find out which one was at fault and to make a diagnosis. This might be rather troublesome but it put one on the right trail to benefit the child.

BLOOD COAGULATION IN INFANCY.

DRS. HENRY L. K. SHAW and FRANK J. WILLIAMS, of Albany, presented this paper, which was read by Dr. Shaw. He stated that the significance of the blood coagulation time in young children had not received from the pediatrician the attention it deserved. One reason for this neglect lay in the difficulties of technic and the wide divergence of results by different methods and observers. The wide variation in results was explained not alone by the different methods and principles, but also by the personal equation which was a very large factor in a blood coagulation test. After reviewing briefly the theories of blood coagulation advanced by Morawitz, Howell, and Bordet and Delange, the writer stated that clinical methods for estimating the blood coagulation time, to be practical, should have simple and inexpensive apparatus, easy and rapid technic, and should show constant and accurate results. They

had been employing two methods depending on different principles which seemed to meet these requirements. The apparatus designed by Boggs, a modification of the Brodie-Russell method, was recommended for hospital and office practice where a microscope was available. The method of Dale and Laidlaw required neither expensive apparatus nor a microscope and could be applied at the patient's bedside in the home. The essential part of the apparatus was a small capillary glass tube containing a small lead shot. The size of the tubing as suggested by Dale and Laidlaw was 2 cm. in length and from 1.3 to 1.4 mm. in diameter. In their investigations in infants they used capillary tubes of a much smaller diameter but of the same length, thereby diminishing the amount of blood necessary for each test. The smallest size of shot obtainable, called dust shot, was found to be the suitable size for the very small diameter of the tubing used. The tubes were cut the desired length and one end was narrowed in a gas flame just enough to prevent the shot from passing through. After the shot was introduced the other end was similarly narrowed so that the shot could roll the length of the tube but could not fall out. A new capillary tube was taken for each determination.

The procedure was as follows: A finger or toe was carefully cleansed and pricked. The first drop of blood was wiped away, but as soon as the second drop appeared a stop watch was started. A capillary tube was brought into contact with the drop of blood and as soon as it was filled, it was placed in a spring clip, the jaws of which were coated with clean plasticine or vaseline. The clip was immersed in a water bath at a temperature of 35 to 40° C. and turned gently so that the shot ran slowly up and down the tube. The shot would travel through the fluid until the viscosity caused its speed to diminish and it would come to an abrupt stop when the tube was held in a vertical position. This was the point of coagulation and the watch was stopped and the reading taken.

By this method, Dale and Laidlaw had found the coagulation time in healthy adults to vary between one minute thirty-nine seconds and one minute and fifty-one seconds.

Dr. Shaw stated that they had made examinations in 108 healthy infants under two years of age by this method and found the coagulation time to vary between one minute fifteen seconds and one minute forty-eight seconds, the average coagulation time being one minute thirty seconds which was slightly shorter than in adults. The reader related his experience with the coagulometer of Russell and Brodie, as modified by Boggs and described by Emerson. They found a lower range of coagulation times than had Sladen and Emerson. In their tests they observed no difference in the clotting time before and after eating, nor at different periods of the day. There was no difference in blood taken from different parts of the body. They found that the first drop clotted more quickly than succeeding ones, and the time was hastened when the tissues around the prick were squeezed or manipulated to force out the blood. The most important factor with the Boggs' instrument was the volume of blood. Care must

be taken to use the same sized drop in order to obtain trustworthy comparable results. The results which they believed they had established by both the Dale-Laidlaw and the Russell-Brodie methods were remarkably constant and they believed they had established a normal coagulation time for infants and hoped in a later communication to compare these results with those obtained in various disease conditions.

THE TREATMENT OF THE DISTURBANCES OF DIGESTION IN INFANCY.

DR. JOHN LOVETT MORSE, of Boston, stated that he employed the classification of the diseases of the gastrointestinal tract which was adopted two years ago by the Pediatric Department of the Harvard Medical School, and which was based as far as possible on the etiology of these diseases. Three consecutive divisions of this classification were: (a) nervous disturbances of the digestive tract; (b) disturbances of digestion; (c) infections. Under the head of nervous disturbances of the digestive tract were included those conditions in which the symptoms referable to the digestive tract were due to disturbances of the functions of this tract as a result of abnormal influences transmitted to it from unduly irritable or exhausted nerve centers. The most characteristic symptoms were those due to the disturbance of the mechanical functions of the stomach and intestines. These symptoms were vomiting and diarrhea, but the vomitus and stools showed no evidence of disturbance of digestion. When the causes which acted through the nervous system caused a disturbance of the secretory functions of the digestive tract the condition was really an indigestion. Disturbances of digestion might be caused by an excess of an otherwise suitable food, by a food too rich but otherwise well balanced and by foods containing an excessive amount of one or of several of the food elements. It might also be caused indirectly by other diseases or by any extraneous causes which weakened the general resistance and diminished the digestive powers. The pathological changes of these disturbances were insignificant. In both the acute and the more chronic cases degenerative changes might develop in the parenchymatous organs. The important changes were in the metabolic processes of the body. These varied according to which of the food elements was the cause of the indigestion. In simple indigestion fermentation played but a small part either in the pathology or symptomatology of the condition and none in the etiology. When the fermentative processes predominated the picture the condition was spoken of as indigestion with fermentation. Fermentation might develop secondarily as the result of disturbance of the normal processes of digestion or appeared primarily as the result of the introduction of an excessive number of bacteria. It might also develop as the result of a change in the normal relations of the bacteria to each other from a badly balanced diet. The term fermentation was here used in its broad sense and included all the changes which took place in the various food elements as the result of the action of microorganisms upon

them. The border line between infectious diarrhea and indigestion with fermentation was rather an indefinite one. Infectious diarrhea was also due to the action of microorganisms, but in this condition the bacteria entered the intestinal wall and produced definite lesions of the wall, which might or might not be severe. Bacteria presumably often passed through the wall into the circulation in infectious diarrhea, as did the products of bacterial growth.

In order to treat these disturbances of digestion intelligently and satisfactorily the cause of the indigestion must be determined in the given case. Much could be learned of the etiological factor in the individual case by a careful study of the food which the baby was or had been taking. More could be learned, however, by a careful analysis of the symptoms, and most by a careful study of the stools. In fact, it was in most instances almost impossible to make a correct etiological diagnosis without an examination of the stools. The macroscopic examination was sufficient in many instances but the microscopic examination was advisable in every instance. This examination was not difficult and could be carried out by anyone in five minutes with a little training and experience. When the disturbance was due to too much food or to too rich food, the amount or strength of the food should be cut down to a point lower than a normal baby of the given age would be taking. The condition would be remedied much more quickly if this was done than if the food was only cut down a little. The amount and strength of the food could be quickly raised when the symptoms were relieved. If the disturbance was due to an excess of an individual food element, the percentage of this element should, in the same way, be cut down to a lower point than would be suitable for a well baby of the given age, especially was this true when the disturbance was due to fat. When an individual food element was cut down it was necessary to raise the percentages of the other food elements in order to keep up the caloric value of the food. In doing this care must be taken not to get an excess of one of the other elements. When the protein was at fault, due to the formation of hard curds, the indication was to prevent the formation of curds and it was advisable not to reduce the percentage of protein, but to prevent the formation of curds by boiling, by the addition of alkalis, or of citrate of soda to the food, by the use of precipitated casein or buttermilk, or by pancreatization of the food. Drugs were of little or no use in the treatment of simple indigestion. There was practically never a deficiency of hydrochloric acid, pepsin or rennin. It was useless to give pancreatin by the mouth because it was destroyed in the stomach. In all but the mildest acute cases the intestinal tract should be cleaned out at the beginning of treatment. For this castor oil was the most useful drug; calomel might be used if there was vomiting, and milk of magnesia in the mildest cases. In severe cases it was advisable to wash out the bowel in the beginning. When the indigestion was a chronic one it was inadvisable to begin treatment with an initial catharsis, since this was a weakening procedure and when the baby was in an enfeebled condition it was liable to do serious injury.

When the disturbance of nutrition was extreme it might take away the baby's last hope of life. When the baby was vomiting all food should be stopped and if the vomiting was severe the stomach should be washed out. Inunctions of oils were useless in the chronic disturbances of digestion. In speaking of indigestion with fermentation, Dr. Morse said that in the vast majority of instances this was due to organisms which produced fermentative changes in carbohydrates and to a less extent in fats. The stools were, therefore, usually green in color, strongly acid in reaction and odor, and irritating to the skin. They often contained a considerable amount of mucus, and not infrequently many small soft fat curds. In acute cases of indigestion with fermentation food should be stopped for from twelve to twenty-four hours, the intestinal tract cleaned out and water given freely. It was not safe to continue the period of starvation longer than twenty-four hours when the microorganisms that were causing the trouble were of the proteolytic type, because the intestinal secretions were protein in nature and provided a suitable medium for proteolytic bacteria. There was no objection to a longer period of starvation when the microorganisms were of other types which thrived on fats and hydrocarbons. The object in this type of indigestion was the inhibition of the activity of the microorganisms which were the cause of the disease. Drugs by the mouth were useless. The salts of bismuth might possibly diminish the severity of the symptoms but the subcarbonate or milk of bismuth were safer than the subnitrate. Irrigation of the bowels was useless. One might inhibit the activity of the bacteria by the administration of antagonistic bacteria. These might be given in the form of broth cultures, buttermilk, or modified milk ripened by them. The latter was the preferable method since the food could then be modified to meet the needs of the individual infant. Of course, lactic acid bacilli should not be given when the trouble was due to excessive activity of lactic acid organisms. Again the activity of the organisms might be diminished by a change in the character of the intestinal contents, that was in the medium in which the bacteria were growing.

When the organisms were proteolytic the percentage of protein should be diminished and that of carbohydrates increased. Babies seriously ill with indigestion with fermentation showed one or more of the characteristic symptoms, excessive vomiting, hyperexia, symptoms of irritation of the central nervous system, prostration and collapse. When any of these symptoms appeared it was advisable to repeat initial catharsis, and if the condition of the baby warranted it to withhold food for twelve hours. Food must not be withdrawn if the trouble was due to proteolytic bacteria. It was seldom advisable to give the coal-tar products to infants to reduce temperature; hyperexia was best treated by the use of cold externally. Bromide of soda in doses of 5 or 10 grains might be given for restlessness and excitement. It might be combined with 1 or 2 grains of chloral hydrate. It was useless in this condition to give drugs by enema. Morphine subcutaneously might be neces-

sary. The baby should be disturbed as little as possible. Alcohol was contraindicated when these conditions were associated with vasomotor paralysis and lowering of blood pressure. Adrenalin was of some value but must be given subcutaneously or intravenously. Strychnia was in general the most useful of the stimulants, while caffein and camphor were the best quick stimulants.

EXPERIMENTS WITH MALT SOUP FOR INSTITUTION MARASMUS.

DR. THOMAS S. SOUTHWORTH, of New York, presented this paper. He stated that not many months ago he assumed control of wards containing a considerable number of bottle-fed, institution infants, and he found himself confronted with the problem of improving their nutrition. An epidemic of respiratory trouble in the form of an infectious cold had recently invaded the wards. Many of the children were still coughing. The stools of the majority were of the white and green color known probably to all institution workers. Many of the infants were losing weight. Careful readjustment of the usual formulas, made of top milk or top milks with limewater or barley-water and the various sugars did not have any appreciable influence. It became evident that it would be impossible to await, as was frequently possible in private practice, the further results of such readjustments of the ordinary types of feeding mixtures. Some plan had to be adopted which would cut short the losses in weight. Malt soup was selected, from previous experience, as the preparation which offered the greater promise of producing the desired results. No attempt was made to follow any stock directions, such as appeared with certain brands of malt-soup extracts since experience had taught that the milk content of malt-soup mixtures should be adapted to the individual requirements of the infants, and that the infants should not be called upon to adapt themselves to one or two preconceived formulas. The purpose was to substitute for the milk-sugar and possibly barley-water of the infants' formula, carbohydrates in the form of the more absorbable dextrin and maltose contained in the malt-soup extract, together with the usual accompaniment of boiled wheat starch for its recognized protective action. Their procedure was to select from day to day those cases whose condition was most critical and to employ for each infant, the number of ounces of milk, or top milk, which it would properly receive in an ordinary suitable formula. To this and the requisite amount of water was added the malt-soup extract and wheat flour, usually in the proportion of one level teaspoonful of each for, approximately, each 10 ounces of the total food. The mixture was brought slowly to a boil to gelatinize the starch, and was then strained, cooled and bottled. Used in this way a malt-soup mixture was not a stereotyped and inflexible infant food, but only another helpful method of modifying milk for the infant's needs. In private practice it was often well to cook the malt-soup mixture for thirty minutes, but this was somewhat too cumbersome for routine

institution work. As a life saver, or at least a prolonger of life, the malt-soup mixtures proved successful in nearly every instance where they were given. The prophecy made at the start, that the stools would become smooth and brownish within twenty-four hours, was as a rule fulfilled. Infants who seemed doomed, promptly showed moderate gains. It was this complete change in the character of the stools which was the most encouraging feature of malt-soup feeding. The digestive disturbances in institutional infants appeared to stand in a class by themselves. Possibly they were due to an undetected ward fact; they were certainly more resistant than similar disturbances in private and out-patient practice, and also than those of infants newly arrived in a well-ordered hospital. It became necessary to introduce something which, in part at least was different, something which made less demands upon those functions of digestion which had been exhausted and that made its own demand upon exhausted cells and ferments. Milk and cane sugar, both of which were disaccharides at time, overtaxed the upper parts of the small intestine, with consequent disorganization of the functions of this important part of the digestive tract. The substitution for either of these single disaccharides of mixed carbohydrates, maltose dextrin and starch, introduced new elements and conditions. Dextrin and starch were polysaccharides, and were more slowly broken up. Both the chemical processes and the absorption were spread over a greater length of intestinal surface, bringing into play new ferments and fresh absorptive areas. This explanation seemed to cover the *modus operandi* of the malt-soup formulas in this class of cases, as indeed, in that of others whose digestive processes had been profoundly disturbed. Dr. Southworth said it had been his experience that malt soup neither caused nor aggravated vomiting, but rather that vomiting had ceased under its administration. A certain amount of gas formation was not incompatible with absorption and gain in weight. In older children suffering from subacute or acute colitis, no food equalled malt soup in its ability to nourish and prevent excessive loss of weight and emaciation.

It always seemed necessary, in connection with every disquisition concerning any particular procedure in the feeding of infants, to make it clear that one was not endorsing a single method to the exclusion of all others and this paper discussed the somewhat extended use of but one of several recognized methods of feeding young infants who did not thrive upon the usual type of formulas. The purpose of the paper was to relate favorable experiences in the use of malt soup in certain instances in which breast milk was not available, and to call further attention to its utility at critical junctures together with certain comments upon the apparent reasons of its efficacy. No claim was made that it solved the whole vexed problem of mortality among institutional infants. There were too many other factors involved beside that of food. More extensive and fundamental changes must be made in the methods of caring for such infants before the mortality of infants

that remained for indefinite periods could be reduced to a reasonable minimum. But the fact remained that a certain fraction of the mortality could be reduced through the introduction of more diversified feeding methods, and that an emergency measure of great value was to be found in the rational use of malt-soup mixtures.

RECENT OBSERVATIONS IN THE USE OF THE SOY BEAN IN INFANT FEEDING.

DR. JOHN F. SINCLAIR, of Philadelphia, presented this paper by invitation. After describing the soy-bean plant and giving its history, stated that in this country it had been used largely for fodder or to increase the fertility of the soil. Experiments made by the Department of Agriculture showed that its uses might be greatly extended. In China and Japan the beans were used in many different ways for food, and the oil was expressed for cooking, illuminating and lubricating purposes. Analysis of soy-bean flour as furnished by the producing company showed that it contained protein, 14.64 per cent.; fat, 19.43; mineral matter, 4.20 per cent.; moisture, 5.26; crude fiber, 2.35; cane sugar, 9.34; nonnitrogenous extract, 14.78; starch, none and reducing sugars, none.

Dr. John Ruhrah of Baltimore had been the first one in this country to draw the attention of the medical profession to the use of the soy bean in infant feeding. He presented his preliminary report in 1909. The writer had been experimenting for two years with the soy bean. He first employed it because of its high proteid and fat content as a weak gruel to replace barley-water, tea, and other liquids in gastrointestinal disturbances in an effort to check the losses in weight which occurred so frequently. In this it had proved most efficient. The writer had used it in seventy-four cases in the wards of the Babies' Hospital of Philadelphia during the past two summers. All of these babies were under three years of age and were ill with summer diarrheas. Thirty-four were diagnosed gastroenteritis, twenty-eight enteritis, and twelve ileocolitis. In thirty-eight cases the condition of the patient on admission was noted as "bad" or "dying," while in thirty-six it was recorded as fair or good. In the series of seventy-four cases, there were nineteen deaths, eleven cases were unimproved, and forty-four babies did well, as evidenced by improvement in their general condition, character of their stools and gain in weight. Some of the babies gained in all these particulars, while others in one or two of them. Twenty-eight of the forty-four cases gained in weight while in the hospital. Of the eleven cases that showed no improvement, all but two were fed too short a time to permit of the drawing of a satisfactory conclusion. In no instance had any bad results been noted from the use of the soy bean. An analysis of the cases showed that the soy bean gruel was fed alone for from one to ten days after which it was used as a diluent for from a few days to five weeks. It had been his custom to place the infant on the soy bean gruel at once on admission to the hospital and to add

no milk until the condition of the stools was markedly improved. Other uses of the soy bean might be mentioned. Where condensed milk must be employed it was of service because it supplied the proteins and fat which were needed and which the condensed milk lacked. Their experience with the soy bean and a careful study of their cases led them unhesitatingly to urge its usefulness in the treatment of summer diarrhea, in various intestinal disturbances, and in marasmus. It was well borne, readily digested, and by reason of its fat and proteid content furnished the necessary pabulum to nourish the sick infant.

DR. IRVING M. SNOW said that of late years there had been a steady fall in the infantile death rate and the writer was convinced that this was due to the widespread knowledge due to such papers as Dr. Morse had read. Nevertheless, several points might be emphasized. The writer believed that disturbance of digestion in infancy was more often due to congenital weakness of constitution disturbed function or metabolism than to infection or organic changes. Often the whole trouble was lowered digestive power for fats and carbohydrates. The injury to the baby's digestion could usually be estimated when attempts at feeding were made. A baby disturbed by small increases of food was in a most serious condition. On the other hand, many babies were made worse by injurious treatment, abuse of laxatives, which certainly emptied the intestine, but which might cause vomiting, irritation, hypersecretion of mucus and rapid emaciation. Especially dangerous was the employment of long and repeated periods of starvation on tea, water, or thin cereal gruel. While it was of obvious advantage to rest the digestive functions and to clear out the stomach and intestines this could usually be effected by giving water or tea for six or twelve hours, seldom longer, unless fever, vomiting and diarrhea were unusually persistent. Where the sick baby was underweight, starvation was a dangerous remedy resulting in a terrific drop in weight and a permanent weakening of digestion. It was better to take chances on a suitable food and not be too critical of occasional vomiting or the color and consistency of the stools. The power of digesting fats was often lessened and a change of sugar would often restore the power of assimilating fats.

In diarrheal cases the frequent mucous stools were due to irritation and rapid peristalsis from fermentation; here a substitution of cane or malt sugar for sugar of milk might result in rapid improvement.

The difficult digestion of casein was a myth. A successful food mixture in a diarrhea was dextro-maltose and skimmed milk at first dilute to be quickly strengthened. Albumin milk and dextro-maltose was of high nutritive value; it was free from salt and fermentable whey and seldom caused vomiting or frequent stools. A thin delicate baby might thus be given a nutritious food. The technic was simple and important. To clear the intestines by a tea period of a few hours and to administer the albumin milk at first in small frequent doses to be rapidly increased. After a few

weeks the baby should gradually be put on a mixture of milk and dextro-maltose. Lastly, human milk was the best of all curative foods. In rare cases of severe intoxication or fat injury it might disagree. It should be early tried in bad cases of food vomiting and in persistent diarrhea which resisted the usual diets. It might be given in a bottle, diluted, used exclusively for two or three feedings a day; even a few ounces daily would arrest emaciation and aid in the digestion of other food mixtures. The fate of the baby depended on its constitutional vigor of digestion; on avoidance of injurious treatment, laxatives, bowel washes, too much starvation, and underfeeding; on removing the baby from prolonged summer heat; lastly, on skill in feeding with dextro-maltose with albumin milk or skimmed milk or breast milk. In treating a baby with serious disturbance of nutrition the physician was advised to be very patient, to use well-tried foods and not to make too many changes.

CAN PNEUMONIA IN CHILDREN BE ABORTED?

DR. T. WOOD CLARKE, of Utica, stated that in spite of the investigations of a Cole and a Lamar, of Cruikshank and of many others pneumonia remained as it was in the Middle Ages, a self-limited fever, which must run its course. In the present state of their knowledge one was justified in following any sign post which might seem to indicate a possible road to a specific medication of pneumonia. It was for this reason that he related his experience in Utica during the past two years, which though suggestive was not convincing. Dr. Clarke said that at that time he was called to see a case of pneumonia in a child where masterly inactivity was indicated but where he knew a *placebo* must be given. Having some hexamethylamine with him he decided that this would be as good as anything, and it might have some beneficial influence by excreting into the alveoli. He left a mixture containing 2 grains to the dram, a teaspoonful to be administered every two hours. The following morning he found a definite area of tubular breathing 2 inches in diameter over the area of dulness, but to his surprise the boy's temperature was normal, his pulse and respiration slow, and he was feeling well and lively. In two days the consolidation cleared up and the boy made an uninterrupted recovery. He thought this was simply a coincidence that the crisis had come four hours after the administration of the drug. However, he determined to try it again. After citing two typical cases, Dr. Clarke said that during the past two years in every case of lobar or bronchopneumonia in childhood he had pushed hexamethylamine to the limit, and with one exception the results had been gratifying. This was an infant four months old that he saw for the first time on the third day of the disease. In spite of all he could do this child went from bad to worse and died on the eighth day. In every one of thirty odd cases of pneumonia in children in which he had used this drug, the temperature had begun to drop within a few hours of the starting of the drug, and in from twenty-four to forty-eight hours the patient

had been well. In a good proportion of the cases this had happened during the first four days of the disease. Dr. Clarke said he had gone a step further and had prescribed the drug in smaller doses in influenza, measles and whooping-cough from the onset. In none of the cases so treated had any pulmonary complications developed. When a child apparently having pneumonia had failed to respond to the drug within twenty-four hours, he had become suspicious of something more than an uncomplicated pneumonia and redoubled his vigilance in searching for empyema, as a result of which he had identified this condition when but a few ounces of pus had formed. When an empyema had started the drug seemed to have little or no effect. This drug should be given with plenty of water or milk, and even with the greatest of care one would at times get strangury or slight hematuria. When this occurred he discontinued the drug and gave sodium bicarbonate, and no untoward results had followed. Dr. Clarke said he made no claim to having found a sure cure for the disease; the fatal case made that impossible. His experience had convinced him that the use of this drug early in the disease, had in a certain number of cases shortened the attack and he believed the physicians of Utica and Central New York were converted to the idea that they were no longer justified in relying on "masterly inactivity" in pneumonia in children. He hoped his confrères with large hospital services would give this drug a try out.

DISCUSSION.

DR. JOHN LOVETT MORSE, of Boston, said that as he understood it, hexamethylamine by itself was an inert substance. It only showed activity when broken up by an acid. If there was this reaction in an acid medium in the lung it might be useful but he greatly doubted if an acid reaction in the lung could be strong enough to render this drug of any practical effect. They were only using this agent in the genitourinary tract which might be rendered acid.

DR. JOHN H. PRYOR, of Buffalo, said that even in the urinary tract the benefit of hexamethylamine had been very much overestimated and the doses had to be made larger in order to be effective even in an acid medium. If any action was to be expected from this drug in the lung the doses would have to be very much larger than had been indicated.

DR. THOMAS S. SOUTHWORTH, of New York, said that contrary to what Dr. Morse had said he believed that they would have to consider whether it had really been proven that hexamethylamine was only effectively split up in an acid medium; if that was the case, then his view held. However, certain genitourinary surgeons were employing this agent in an alkaline medium and believed they were getting very good results. Whether it was possible for hexamethylamine to be useful except in an acid medium was an open question, at least to his mind, and it might be developed that the drug was valuable in other than acid media and if that should prove to be the case there might be some basis for Dr. Clarke's view. Any definite

statement, however, should be made with reserve for there might be some doubt whether the cases were really pneumonia.

DR. T. WOOD CLARKE, of Utica, said he was glad to hear these criticisms and wished that some who had the advantage of large hospital facilities would try this drug out.

A PRELIMINARY REPORT ON THE ROLLIER TREATMENT FOR SO-CALLED
SURGICAL TUBERCULOSIS.

DR. JOHN H. PRYOR, of Buffalo, said that tuberculous lesions by an arbitrary custom when located elsewhere than in the respiratory tract had been grouped and defined quite unreasonably as belonging to the field of surgical tuberculosis. This habit had led to unnecessary operating or other forms of surgical interference with unsatisfactory or disappointing results. This had directed attention to local rather than constitutional conditions, and led to a disregard of common-sense agencies. It seemed obsolete and ridiculous to grasp all that hygiene would offer for those afflicted with tuberculosis of the lungs and neglect it when the sufferer was a child and the disease had attacked the bones or some other part of the anatomy which by a freak of fancy or fashion made it an alleged surgical case. That there was a genuine need for surgical relief which must be invoked at times was appreciated, but the operation should be superseded or followed by other beneficent influences.

The writer reviewed the history of heliotherapy and gave a report of the work of Rollier at Leysin, showing that he claimed more than 80 per cent. of recoveries in closed cases and over 70 per cent. in open cases. Rollier had treated during the period 1905-13, 1129 cases. Rollier asserted that 308 of these recoveries were associated with motion of previously affected joints. The important features of Rollier's method were that the isolation was very gradually and slowly completed. The diseased part was kept covered and only exposed to the sun after the coat of tan was existent over the rest of the body. The patient was accustomed to open-air life and sleeping out of doors for about one week. During this period the temperature, pulse, respiration and the results of urinary and blood examinations were recorded. Preparation for the sun bath included protection from wind or draft. The head was protected by a linen cap or a small awning at the head of the bed. Very gradually, by exposing a small portion of the body at one time, the entire body, and finally the diseased part was exposed and tanned as deeply as possible. After each insolation the patient was rubbed with spirits of camphor with a rough glove. Ultimately, the insolation was practised four to six hours every day. This treatment was all carried out on the bed to secure convenience and control. Caution must be observed to prevent sunburns and dermatitis. Reactions might occur if the exposure was pushed too rapidly. When the children were hardened by exposure an air bath was given on cloudy days to maintain it. During the summer the children well tanned could play or walk most of the day unclothed except for a loin cloth. The skin became a

bronze hue and then a copper color and finally the chocolate brown which signifies intensive pigmentation. Those who visited Leysin reported that Rollier's claims are justified and his report of results not exaggerated.

So far as Dr. Pryor knew, he said that Rollier treatment was first introduced into this country and perfected at Perrysburg, N. Y., at the Adam Hospital. The site was 1650 feet above sea-level with woods for wind protection. This experiment with the Rollier treatment was begun in December, 1913, with a few patients suffering from tuberculosis of the bones or glands. The building when completed in June would accommodate 120 children. The buildings were planned for open-air life day and night with protection from wind and exposure to the sun. The child was naked except for a loin cloth, a cap and slippers, with stockings in the winter. In the winter the children were permitted such games as snow shoeing, tobogganing and sleighing. The day the pictures which were shown were taken the children played one hour unclothed in the snow. This freedom was only allowed after months of exposure with considerable pigmentation and gradual hardening. The children thus had exercise, games, and open-air school.

They had demonstrated that they could pursue the same methods as Rollier described without any risk or danger in this climate. The exposed children developed marked resistance to cold and its consequences. As the treatment progressed practically every case showed increase of hemoglobin and red cells. The increase in lymphocytes was marked. The open lesions with secondary infection or abscess and the high leukocyte count, fell gradually and soon remained normal. Colorado, New Mexico and Arizona seemed to have an ideal climate for heliotherapy, but the climate of Switzerland was not a sunny one and they had shown that good results could be obtained in localities with somewhat unfavorable weather conditions. The large number of tubercular dependents could not be sent away and they were forced to care for them near home. The duration of the treatment was long, but the results justified resignation and patience. At the present time sixty-five patients were undergoing treatment in strict accord with Rollier's method. Of these, forty-seven were children under fifteen years of age. Ten had pulmonary tuberculosis but there existed other manifestations as bone or gland involvement. It had been found that complications disappeared rapidly under sun treatment. After describing the various lesions that had been treated and citing a number of cases, Dr. Pryor stated that it must be remembered that a large percentage of cases had failed to recover by other methods of treatment. They were mostly advanced chronic types with loss of motion and partial or complete loss of function. A few of them had marked atrophy from nonuse and the employment of plaster casts or splints. The atrophy certainly did not occur with rest, sun exposure, and the appliances recommended by Rollier. All the patients at the hospital were improving in various ways which had not been apparent with open-air

treatment alone, as was shown by better nutrition, increase in weight, the subsidence of fever, return to normal blood count, and a subsidence of active inflammatory conditions. Motion returned in cases in which it had been entirely unexpected. The results seemed so remarkable that they justified incredulity until one had seen and was convinced. Thus far Rollier's astonishing statements had been proven true. Their limited opportunity for observation led to the conclusion that a new and powerful agency had been added to their methods of conquering tuberculosis. The crusade should begin with the child along broad natural sociological and rational lines. They should send more afflicted children to the country where they belonged.

NUTS AND FRUITS: THEIR VALUE IN THE DIET OF CHILDREN.

DR. GEORGE DOW SCOTT, of New York, presented this paper. He stated that among the laity there was a firm conviction that nuts gave rise to indigestion and fruits caused hyperacidity. To some the knowledge that nuts were highly nutritious was new. Nuts, however, contained water, protein, fat, sugar, starch, crude fiber, and ash in large proportions. Each kind of nut had its particular caloric value. Dry nuts were very high in nutritive value and contained more fat than any vegetable substance known. In nutritive value nut butters were far above ordinary cream butter. The writer had given nuts to children as a substitute for meat because of the nutritive value in intestinal fermentation. The proportion of the different food elements varied in the different varieties of nuts. The discomfort of eating nuts was due to faulty mastication and to the erroneous habit of giving them to children after a hearty meal, between meals or late at night, whereas they should form an integral part of a meal. Probably nut protein was not as easily digested as meat protein on account of the water content of 3 to 5 per cent. in nuts against 50 to 70 per cent. in meats. It was therefore fair to assume that the finer nuts were divided, chopped and mashed, the more rapid would be their digestibility. Salt did not make nut food more digestible.

Dr. Scott spoke of the part that nuts played in the dietaries of other peoples and said that mothers in this country should understand the food value of nuts better, giving a variety of nuts to suit the individual child, but it must be understood that they were given as an addition to the diet. Cautiously, after weaning, the child should be given nut butter. Such butters must be more carefully prepared than those for older children. The nut kernels were pounded in a nut mill until of a thick creamy consistency, strained through two layers of clean boiled muslin or a fine wire sieve. Fruit juice or finely cut or mashed fruit should be added. The stools should then be watched for undigested particles or any chemical disarrangement as diarrhea, duodenitis or enterocolitis. If the butter agreed the quantity could be gradually increased, care being taken to avoid overstocking the child's stomach or digestive

capacity. In the constipation of infants nuts formed a valuable aid as a lubricant on account of their oils, but they acted as irritants because of the large amount of refuse which they left.

Fruits were given to infants because they were palatable, refreshing, nutritive and because of their salts, their diuretic laxative, tonic and antiscorbutic action. A fruit régime was devoid of toxins and was bad culture media for bacteria. In scurvy, stomatitis and other digestive conditions the fruit juices were almost a panacea on account of their antiscorbutic qualities. In conclusion the nutritive qualities of fruits and nuts were not to be depreciated; these foods were not to be given to the child as a pleasurable and luscious appetizer only, but as a food addition to the general diet, stimulating, nourishing, and exhilarating it to a stronger mental and physical existence.

Dr. Scott presented tables showing the percentages of food elements in the different varieties of nuts and of foods made from nuts and compared them with other foods.

HEREDITARY SYPHILIS: THE EARLY MANIFESTATIONS, STARTING FROM INTRAUTERINE LIFE UP TO ONE YEAR OF AGE.

DR. LE GRAND KERR, of Brooklyn, stated that congenital syphilis was not easy to diagnose. He made this statement because scores of cases seen in consultation had been variously diagnosed. Two conditions comprised over 90 per cent. of the mistaken diagnoses, namely, malnutrition and bronchitis. Ordinarily they thought of congenital syphilis only as it showed itself in a more or less virulent infection in the offspring, but there might be the hereditary transmission of constitutional changes which were the result of the specific poison in the parent. The manifestation of these changes in the offspring were in more or less marked general disturbances which were not traceable to other sources. If one considered only the first type of cases he was taking a very narrow view. They frequently saw infants exhibiting tissue changes which were attributable to syphilitic infection, but without any evidence of the usual syphilitic lesions. One might call these manifestations parasymphilitic, dystrophic, or toxic, but they were the result of a syphilitic heredity. So much had been laid at the door of syphilis that the variety of the dystrophies might be used as an argument against their syphilitic origin, but the polymorphism of syphilitic manifestations must be remembered. There was abundant evidence that tuberculosis often, and alcohol occasionally, produced dystrophies, nor was evidence lacking that sepsis and enteric poisons might produce similar results. The dystrophies of syphilis were special in that they were varied and numerous.

The ordinary manifestations of syphilis were due to the action of the virus upon organs and tissues whose development was beyond the embryonic stage and which had entered the epoch of growth and functioning. Therefore it was possible that both morbid changes and dystrophies might exist at the same time in one infant.

In syphilis acquired late in pregnancy the dystrophies were usually absent, since they were the result of the action of the poison upon forming organs and tissues.

Several factors must be considered in the diagnosis, the family history, the type of disease, the appearance of the infant at birth and the appearance and symptoms some time after birth. After speaking of the difficulties of obtaining the family history and stating that the question, "Have any of the family ever had syphilis" should never be asked, the writer stated that it was better to obtain a history of events that would establish presumptive evidence as to the existence of the disease. These several events were: (a) Tendency of the children of a given family to suffer from unaccountable anemias and malnutrition during the earlier periods of life, despite good hygienic and dietetic care. (b) The occurrence of anomalous types of disease in two or more children of the same family, or the unusual course of a disease under similar circumstances. (c) Tardy development without a recognized cause, or occurring as the result of a recognized cause, but out of all proportion to that cause and occurring in two or more children of the same family. (d) The occurrence of a rachitic type of skull without other evidence of rachitis being proportionately marked. (e) History of the disease, direct or presumptive, in one or both parents. (f) A history of the abortive habit in the mother without definite cause, most commonly between the fourth and seventh months. During the last four months of pregnancy if the fetus was expelled the evidences of the disease were usually unmistakable. The high fatality was due to visceral changes which were compatible with intrauterine life but were unfavorable to extrauterine existence. The rapid death of the infant might be the only evidence of congenital syphilis. These cases were commonly diagnosed as acute malnutrition. Probably many infants died during the first few weeks of life from "bronchitis" which was in reality syphilis of the lungs. Between birth and the time of active symptoms there was no test that was pathognomonic of congenital syphilis. The Wassermann reaction was unreliable at this time, however, valuable it was at other periods of life. Other tests were likewise uncertain. Symptoms present at birth indicated the severity of the infection, and such infants usually lived but a few days. These symptoms were shrivelled appearance, more or less tense bullæ set upon a deep red base or surrounded with a dark or brownish ring and containing serum, blood or pus. In much smaller numbers were seen less tense bullæ, drying rapidly into areas of a dusky hue upon which the epidermis lay in brown crust.

Of the symptoms occurring sometime after birth the most prominent was a persistent rhinitis, varying in degree. During the first few days of life one could commonly demonstrate a swelling of the nasal mucous membrane, particularly that of the inferior turbinated bone. There might be fissures about the openings of the body radiating outward from the mucous surface. The peculiar eruption on the skin usually appeared after the rhinitis and remained a

prominent feature of the disease. After a few months it was not unusual to find the hair thinned out, nails involved, spleen enlarged, and there might be hoarseness or aphonia. Upon the nervous system the disease showed very early and marked effects seriously affecting the normal development. Enlargement of the testes in early infancy was almost pathognomonic of syphilis. Keratitis was the most characteristic of the eye conditions and anemia was always present and might be profound. Of the bone affections, epiphysitis was the most common accompaniment of the early manifestation. With widespread bone involvement there might be crepitation, and the danger of mistaking such an occurrence for paralysis was great. This symptom, when it occurred, was almost always present during the first six weeks.

The writer called attention to the changes in the skull, the most usual being in the form of a gummatous periostitis; to dactylitis, which was not as common as epiphysitis; to the late eruption of the teeth, and hemorrhagic effusions as further evidence of hereditary lues. An irregular type of temperature was common to congenital syphilis.

In speaking of prognosis Dr. Kerr said it must be remembered that congenital syphilis was a much more fatal disease than the acquired form in adults and as the vitality of the child was so markedly affected the prognosis must be guarded as to the future physical and mental vigor of the child.

HEREDITARY SYPHILIS: LATER MANIFESTATIONS AFTER THE AGE OF ONE YEAR.

DR. L. E. LA FETRA declared that although useful the distinction between early and later hereditary syphilis was somewhat arbitrary and artificial. There really was no time limit, but it had been the custom to consider the manifestations of hereditary syphilis that appeared first about the time of the second dentition as those of late hereditary syphilis. In general these corresponded largely to those of the tertiary stage in adults and the symptoms of congenital hereditary syphilis corresponded largely with those of secondary syphilis in the adult, but even in early infancy visceral and bone changes might occur, while on the other hand, in the period following infancy there might be outbreaks of condylomata and of various secondary skin manifestations. The symptoms of the hereditary taint would depend for their number and severity largely on the virulence of the inherited syphilitic infection.

In bodily appearance the subject of hereditary syphilis might show some stunting of the growth, sallowness or yellow pallor of the skin, scars in the form of pock marks, the result of deep lesions in earlier life. In the early years the skull might be rather large and square with evidences of rachitic hypertrophy of the bosses on the frontal and parietal bones. Again the head might become large because of syphilitic hydrocephalus. In later childhood the frontal bones might be rough and irregular, and with tender spots due to the presence of gummata.

Interstitial keratitis was the most frequent ocular manifestation; the eye might suffer from iritis, or in rare instances there might be chorioretinitis, in severe cases accompanied by optic neuritis and atrophy. There might be deafness due to otitis which was not specific, but the characteristic deafness was central in origin and due to specific degeneration of the auditory nerve or involvement of the labyrinth. Saddle or pug nose and rhagades or their scars might remain from earlier lesions, and were practically pathognomonic. Snuffles might persist. It could not be emphasized too often that it was only the upper central incisors that showed the characteristic changes of hereditary syphilis. There were three types of Hutchinson's teeth, the peg shaped and widely separated, the screw-driver shape, and the form in which the cutting edge was narrow but the sides convex. In all of these types there was at the cutting edge a deficiency of enamel and often of the underlying dentine. When present these tooth abnormalities were considered presumptive evidence of hereditary syphilis, but it must be borne in mind that they were often absent even when there were characteristic syphilitic changes in the bones in other parts of the body. A persistent hoarse voice might at times be the only symptom. The author's personal experience had been limited to the congenital abnormalities of the heart accompanying hereditary syphilis; he had never recognized syphilitic myocarditis in older children. Enlargement of the spleen and liver were very common, while enlargement of the testes in early life, or enlargement followed by atrophy in later childhood was almost diagnostic of syphilis, provided tuberculosis could be excluded. The extremities might show dactylitis closely resembling spina ventosa due to tuberculosis. The differential diagnosis could usually be made by searching the rest of the body, or if this showed nothing by the Wassermann reaction. The most characteristic manifestations of late hereditary syphilis were the changes that took place in the long bones, and especially the tibia, which the French called the "Tell-tale" bone. In addition to enlargement and curvature of the tibia frequently there was a marked irregularity of its surface and occasionally larger or smaller nodules or indentations. The bone was apt to be tender on pressure or tapping. The extremities might show other changes, the most important of which was multiple arthritis which was a late manifestation and was commonly met with in the knees and ankles, usually bilaterally. When the bones were not involved there might be a simple effusion with no thickening of the synovial membrane or the effusion might be accompanied by such thickening of the synovial membrane, joint capsule and adjacent tendon sheaths. This form usually affected the small joints of the fingers, wrist and foot. The commonest form was that which resembled arthritis deformans. In very young children the skin lesions consisted of the maculopapular eruption or its pigmented remains, or of condylomata; in later childhood there were the small nodular syphilides with more or less serpiginous arrangement and the larger nodules due to gummata in the skin or underlying tissues. Hypertrophy

of the lymphoid tissue was general throughout the body, but most important for diagnostic purposes were the epitrochlear lymph nodes. If both of these were enlarged and there had been no skin lesions on the hands and forearm, the finding was almost pathognomonic of syphilis, if one excluded tuberculous dactylitis or pyogenic infection.

Since the employment of the Wassermann reaction and the finding of the spirochæta in the cases of general paresis, almost every form of nervous tissue disturbance had been found to be due to the organism of syphilis. In view of the improvement that might reasonably be expected from proper treatment in many of these nervous and mental cases, the possibility of hereditary syphilis as their cause should be kept in mind, and the Wassermann test done in all cases.

In order to give some idea of the clinical types of hereditary syphilis met with in children Dr. La Fetra had gone through the records of the Bellevue Hospital Children's Service for the past two and one-half years. Careful Wassermann tests had been made on all cases with suspicious physical signs or symptoms. During this period there were 148 cases of syphilis admitted to the wards; of these three were cases of acquired syphilis, eighty-five were hereditary but under one year of age, and the remaining sixty were of the hereditary type and over one year of age. Of these sixty patients there were ten that showed no symptoms nor physical signs at all characteristic of hereditary syphilis. Many of these patients showed absolutely no abnormality or they exhibited some equivocal eruption, but it was known from the Wassermann test that they were suffering from a serious constitutional disease. Because of the activity in prophylaxis of the Social Service Bureau they were sent to the hospital because they belonged to syphilitic families. Of the sixty cases there were suspicious or equivocal signs in twenty-one, which though suggestive were not sufficiently characteristic to warrant a diagnosis at the time of admission. Twenty-nine of the sixty cases had signs that were characteristic of hereditary syphilis. It was noted that the commonest signs among the younger children were the eruption, rhagades and condylomata; while among the older children the changes in the bones were most often met, next in frequency were feeble-mindedness, backward development and affections of the central nervous system, such as epilepsy, hemiplegia and general paresis. There was no case of chorea or of juvenile tabes in this series. It was remarkable in view of the stress laid by all teachers upon the symptom of Hutchinson's teeth in late hereditary syphilis that among the twenty-four patients over six years of age in this series this deformity was present only four times. Not once was Hutchinson's triad, of teeth defect, keratitis and central deafness met with. This combination of signs was undoubtedly pathognomonic, but in the experience of the author the complete triad was seldom developed except in very severe and neglected cases. Enlargement of the epitrochlear lymph nodes was present in eighteen out of sixty cases, and was the most important single symptom excepting the Wassermann reaction.

The most important lesion derived from a consideration of the symptoms and signs found in these cases of hereditary syphilis was the well-worn conclusion that an early diagnosis with its corollary of vigorous treatment was of the highest possible value to the patient. As an aid to this early diagnosis in doubtful cases the Wassermann test carefully applied by a competent man might be relied upon almost absolutely.

SYPHILIS AS A CAUSE OF FEEBLE-MINDEDNESS.

DR. HENRY H. GODDARD of Vineland, N. J., outlined the results of his efforts to ascertain to what extent syphilis was responsible for feeble-mindedness in the institution with which he was connected. He declared that this whole subject was in rather chaotic condition since most of those who had collected statistics had failed to make distinctions between the various grades of mental defectiveness. The conclusion that since a parent had syphilis and the offspring was feeble-minded, therefore the feeble-mindedness was the result of the syphilis was unwarranted. The charts presented showed the results of a study of the family history of children of different grades of mental deficiency. There were so many factors concerned that it was impossible to draw definite conclusions, but it was very definitely shown that syphilis was not nearly so frequent in the forebears of the feeble-minded as feeble-mindedness, or, at least, a neurotic family history. It was doubtful whether syphilis was more frequent among the feeble-minded than among the general population, though a greater prevalence among the feeble-minded might be accounted for on the ground that these individuals were less able to protect themselves from this disease and less likely to seek treatment for it. In the series presented syphilis was more frequently found among the high-grade morons than among the low-grade idiots. If syphilis was responsible for feeble-mindedness one would expect to find it oftener among the low- than the high-grade defectives. This entire field was one that needed further investigation.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Cerebrospinal Fluid in Health and Disease.—C. H. Frazier (*Jour. A. M. A.*, 1915, lxiv, 1119) states that it has now become possible to differentiate types of hydrocephalus. Of a given amount of phenolsulphonephthalein injected into the ventricles, 60 per cent. should be recovered in the urine in two hours. This test becomes one of great value not only as a guide to pathogenesis, but also to treatment. A low elimination of phenolsulphonephthalein indicates delayed absorption. The treatment, therefore, becomes a problem of drainage. The nonobstructive type may, by deduction, be ascribed

to a state of hypersecretion, and if this were true, treatment should be aimed at the secreting organ, the choroid gland. Thyroid extract diminishes the output of cerebrospinal fluid. One of several cases of hydrocephalus, now under treatment with thyroid extract, has so improved, that at the last report the child was, so far as one could judge, normal. This single instance is mentioned in the hope that others may be encouraged to apply this treatment in suitable cases and determine its efficacy. Of the many methods of draining in the nonobstructive cases, the writer speaks hopefully of draining the basal cisterns into the pleural cavity.

Fixation of Fractured Bones in Infants and Young Children.—The following method has been employed by E. H. Bradford and R. Soutter (*Bost. Med. and Surg. Jour.*, 1915, clxxii, 508) in fracture of the upper arm of a young child and in a fractured femur in a two months' old baby.

By means of a long bone drill, with an eye at the point, the broken bone is pierced and strong thirty-day catgut threads passed through the eye of the needle thrust through the skin. On withdrawing the needle the catgut is pulled through the bone. Any needed number of catgut cords can be passed. The skin is protected by a layer of fat-free leather, which will soften when wet and harden rapidly into stiffness. This leather soaked in alcohol is sterilized and placed around the limb and the catgut threads passed through it. Small wood coaptation splints are then placed in desired places pressing on the side of the limb, one to check a forward and backward movement of the fragments and another to prevent sideplay. Traction is then applied to the limb, the coaptation splints are held in position; the catgut threads passed through the fractured bone are tied to the coaptation wood strips, thus firmly lashing the fragments in proper position to a firm splint; over the whole a second layer of alcohol softened leather can be placed, held by a firm bandage and the limb secured in a wire splint. The leather softened in alcohol hardens quickly on the evaporation of the alcohol and in a short time the fractured limb is held in a firm leather splint. In the cases in which the method was used the leather splints and wood splints were removed in four weeks, the catgut having softened and the fracture being firmly healed. It is necessary that the alignment should be kept during the healing of the bone. This is even more important than the exact apposition of the broken ends and is of especial importance where the fracture is near the joints especially the hip and the shoulder. Another consideration of importance is the need of securing the limb with little bandaging as possible. Atrophy of tissues and degeneration of muscles are well known to occur from prolonged pressure, also a change in the tissue of the bones in long bandaged limbs, which cannot be conducive to rapid healing. Plaster bandages are to be avoided as much as possible in infants and young children for this reason and also from the fact that frequent inspection of the injured limb is important. Hip-joint fractures proper in very young children may be, in fact, epiphyseal tears or separation of epiphysis and can best be treated by means of an abductor

traction splint used in the treatment of hip disease. In shoulder injuries, the humerus should be held abducted at the elbow, strongly flexed. Joint and epiphyseal fractures at the knee require care to prevent backward displacement of the lower fragment if the hamstrings are kept on the stretch. This can be best accomplished by keeping the limb in a slightly flexed position at the knee, after carefully placing the fragments into as suitable position as possible by manipulation, with retention in the position of election by suitable and carefully adjusted and carefully watched pressure. This fracture needs constant inspection. Joint fractures and epiphyseal separations near the wrist and ankle in children need frequent inspection and less prolonged fixation than is necessary in adults.

Schick Reaction.—H. N. Bundesen (*Jour. A. M. A.*, 1915, lxiv, 1203) states that by means of the Schick test we are in a position to tell definitely who is susceptible to diphtheria and when an epidemic breaks out can inject those and those only, paying no further attention to the ones giving a negative reaction. By it the danger of cross-infection is greatly decreased. Children with diphtheria that have had scarlet fever and are therefore immune from scarlet fever can be placed in scarlet-fever wards when the inmates yield negative Schicks, etc. It permits a great reduction in anti-toxin bills. Much needless pain and annoyance of patients is avoided and the possibility of anaphylactic shock is greatly minimized. In 800 persons the writer found 60 per cent. possessors of antibodies in sufficient numbers to make a prophylactic injection of diphtheria antitoxin superfluous. No case of diphtheria developed in those showing a negative Schick reaction. In regard to the new-born, their high percentage of immunity is undoubtedly accounted for by the fact that the colostrum and even the milk of nursing mothers to a certain degree is antitoxic. Of those cases showing a negative result, 8 per cent. had diphtheria at some previous time, while 23 per cent. of those yielding a positive reaction had suffered from diphtheria. Of the forty-four "carrier" cases, 70 per cent. were negative and 30 per cent. showed a very faint reaction. Not one frankly positive occurred among the forty-four cases. Children of the same family invariably gave a similar reaction. They were either all negative or all positive.

C. Graef and G. Ginsberg (*Jour. A. M. A.*, 1915, lxiv, 1205) report their results with the Schick test in adults and children in an outbreak of diphtheria at Lincoln Hospital. They show that the most susceptible age is between one and five years. Immunity obtained by having the disease or by the use of immunizing doses of antitoxin lasts from a month to several years, varying greatly in different individuals and being very brief in children.

Schick, in his work, used 0.1 c.c. of toxin dilution which contains exactly one-fiftieth the minimum lethal dose, and Park preferred to use 0.2 c.c. E. E. Moody (*Jour. A. M. A.*, 1915, lxiv, 1206) uses a dilution in which 0.05 c.c. contains one-fiftieth the minimum lethal dose, as the results seem to be quite as constant and the discomfort accompanying the injection of the smaller quantity is less. In 524 cases,

none of which had been immunized, he obtained approximately the same results as Schick and Park. The period of greatest susceptibility to diphtheria is between the fifth and sixth years; those of least susceptibility are under one year and over fifteen. Four weeks after receiving 1000 units of antitoxin subcutaneously, Schick tests were made on 316 children. Seventy-eight, or 24.5 per cent., reacted positively, which is a little more than one-half the percentage of positive reactions obtained in nonimmunized children seen that the relative percentage of positive tests corresponds fairly well, according to ages, with the results in individuals who were not immunized. This seems to indicate that, at any age, the immunity conferred by the usual prophylactic dose of antitoxin is effective for a period of less than four weeks in over half of the cases immunized. In order to determine how many of the cases which reacted negatively to the one-fiftieth minimum lethal dosage and therefore had as much as 0.031 units of antitoxin per cubic centimeter of blood, would have as much as 0.06 units of antitoxin per cubic centimeter of blood, fifty-five cases were tested with one twenty-fifth the minimum lethal dose, that is, with exactly twice the quantity of toxin. Forty-four, or 80 per cent., gave negative reactions, which may be taken to indicate that, per cubic centimeter of blood, this percentage of cases has more than twice the amount of antitoxin that is necessary to protect from diphtheria. There is no immunity conferred by this minute dose of toxin, as cases which react positively continue to show positive reactions to injections over a period of weeks, unless immunized by an active diphtheria or by the administration of antitoxin.

Early Congenital Bone Lues.—According to J. R. Kuth (*Arch. Pediat.*, 1915, xxxii, 244) the bone lesions of late congenital lues and acquired lues are distinctly different from those of fetal and early congenital lues. In the early congenital type the disease affects chiefly the ends of long bones. The characteristic lesion in early congenital lues is an osteochondritis. The diagnosis of early congenital bone lues presents no difficulties. Signs of congenital lues elsewhere, the characteristic swelling of the joints with the pseudo-paralysis of Parrot, the Wassermann reaction, which gives a very high percentage of positives in these cases, together with the radiographic examination of all the extremities, are all important. E. Fraenkel says that when all other signs are absent a diagnosis can be made from the radiograph alone. The earliest radiographic changes in osteochondritis are best seen in the fetus or in the child at birth or shortly thereafter (a few weeks). The longer the child lives the less distinct the changes become, until they finally disappear. When present typically, the radiograph shows a heavy, broad, homogeneous, irregularly jagged, band-like shadow at the epiphyseo-diaphyseal junction well separated from the diaphysis and jagged toward the epiphysis. Beneath this there is a band, showing increased penetration by the rays, which gives the impression of a break in the continuity in the shaft. Below this, the shaft is seen to continue. Along with these changes at the epiphysis there is to be seen a thickening of the periosteum, or the appearance as if the periosteum

were lifted away from the bone cortex. In the more advanced state (gumma and osteomyelitis), the spongiosa in the affected ends of the diaphysis shows a washed appearance, with defects, containing often small irregular denser specks. Partial or total epiphyseolysis may also be seen in the radiograph, the separated edges showing very ragged. These changes are followed by a pronounced atrophy (postluteic atrophy). It is important to have these lesions of so protean a disease as lues in mind, as their recognition is then easy.

Management of Children between One and Two Years of Age.—

R. D. Freeman (*Arch. Pediat.*, 1915, xxxii, 266) says that discipline is the keynote to the situation and this discipline must begin with the mother. By discipline he means a thoroughly thought-out scheme for the management of every part of a child's life. Many so-called difficult feeding cases are simply due to motheritis. A great deal of time is wasted between the period when a child commences to have other food than milk up to the time it is on regular meals of plain, sensible food. Age has nothing to do with the question; development is the only sound criterion. Dentition is the sign for the commencement of weaning, either from the breast or the bottle and the author aims to have a child on three regular meals daily in three months from the time two teeth are cut. From the commencement of weaning everything is fed from a spoon till the three meals are established. Then absolutely nothing is permitted between meals. A child should have nothing to say about its meals and should not be given sweets in any shape, crackers between meals, or a bottle to go to sleep on. The creation of an appetite demands discipline of both mother and child. There are four essentials in the matter of food—the kind of food, the quality of food, the cooking and the serving. The child may be prejudiced forever against certain articles by the way they are being served. Meals ought to be made a function, the child bathed and dressed cleanly and the table laid as for an adult. Many children cannot take much milk without getting an intoxication, showing itself in periodic attacks of temperature, vomiting, diarrhea with foul stools and an intense indicanuria; some do better on a milkless diet; some on milk only if it is cooked; certainly the amount of milk ought to be largely decreased when a child gets on three meals. Cereals and vegetables are probably the two hardest articles of diet to get a child to like; consequently the greatest care ought to be taken of the way in which they are first presented for meals. If a meal is presented to a child and is not eaten no substitute ought to be made. Meals should be made attractive in every possible way without in any way catering to caprice. Sometimes a little starvation is the best possible fillip to an appetite. The less clothing a child is accustomed to wear, the fewer colds it will take and the more automatic will be the heat regulation by the skin. Porous linen is the best underclothing, the overclothing to be regulated by the outside weather. A child's clothes should be of good quality, well made, few in variety, always kept in good repair and as clean as possible. Fresh air to the child is as gasoline to the motor car: it is the thing that makes the machine

go. The daily morning tub ought to be insisted on and of a temperature as low as can comfortably be borne. Hands and face ought to be attended to always at meal time. The mother who will not let her child destroy his toys, or pick a flower to pieces, or tear his pictures, or tease his dog is encouraging constructive tastes in her child for the delights of respected responsibility, for the appreciation of the wonders of nature, for the gratification of the sense of the beautiful and for the respect due to the feelings of living things.

Influence of Menstruation on Breast Milk.—The study of C. G. Grulee and F. C. Caldwell (*Amer. Jour. Dis. Child.*, 1915, ix, 374) deals with a baby born with a harelip and cleft palate, nursed for nine months by means of a specially devised breast pump. The mother's menstrual period began six weeks after birth and continued throughout the nursing. The quantity of milk was carefully measured, especially during the last four months of lactation and there was shown a distinct relation between the quantity of breast milk and the occurrence of the menstrual period. This consisted in a period of increase of breast milk beginning with the first day of menstruation and lasting from ten days to two weeks thereafter. There then occurred a diminution in the quantity which reached its lowest point four to seven days previous to menstruation after which there was a gradual increase.

Epidemic Cerebrospinal Meningitis Treated with Flexner's Antimeningitis Serum.—W. A. Smith (*Amer. Jour. Dis. Child.*, 1915, ix, 418) records five cases varying in duration from four hours to twenty-three days were all favorably influenced by the antimeningitis serum. All the patients recovered without sequelæ. A study of these prolonged cases shows the necessity of repeated injections of the serum and of continuing the withdrawal of cerebrospinal fluid at frequent intervals well after the fluid is clear and no organisms are to be found microscopically or by culture. The prompt amelioration of nervous symptoms after lumbar puncture make this clear. That such large quantities as 20 to 80 c.c. of fluid can be withdrawn shows that temporarily the injury to the meninges prevents the absorption of the fluid which is undoubtedly formed in excess owing to inflammatory irritation of the choroid plexus. These cases serve to emphasize the fact that in any case of meningococcus meningitis, no matter of what duration, provided viable meningococci are present, Flexner's antimeningitis serum should be used repeatedly and that even in apparently unfavorable cases, complete recovery may occur.

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*Proceedings of the Twenty-eighth Annual Meeting held at
Pittsburgh, Pa., September 14, 15 and 16, 1915.*

The President, CHARLES L. BONIFIELD, M. D., in the Chair.

President's Address.

SOME COMMENTS ON PRESENT TENDENCIES IN GYNE-
COLOGIC AND OBSTETRIC PRACTICE.*

BY

CHAS. L. BONIFIELD, M. D.,
Cincinnati, O.

FELLOWS of the American Association of Obstetricians and Gynecologists: The rules of our Association demand that I, as your presiding officer for the year, occupy at least a few minutes of your time with an address.

I wish to begin by thanking you most heartily for honoring me by electing me to this exalted position. I regard it as the greatest honor that has ever been conferred on me and expect none greater in the years to come. I realize that for it I am indebted more to your generosity than to any achievements of my own and that thanks, no matter how deeply felt or fully expressed, are a very insignificant

* Read before the Twenty-eighth Annual Meeting of the American Association of Obstetricians and Gynecologists at Pittsburgh, Pa., September, 1915.

return for so great a favor. All I can give you in addition is a faithful performance of the duties of the office and a pledge of continued active interest in the Society when I shall have returned to the ranks.

Custom requires me to express my views as to some of the achievements of the recent past, the present status, and the outlook for the future of those branches of the healing art to which this Society is devoted. In the early life of the Society it was comparatively easy for the President to occupy the time allotted to him with a review of the progress for the preceding year, for gynecology was a new science then and the strides forward were both long and numerous. New operations, modifications of old ones, and improvement in technic followed one another so rapidly that within the elapsing time between meetings there was ample material. But now progress is not so rapid, chiefly because there is not so much to make. I shall not on this account, however, follow the example of a former President of a sister society and after a critical study of the transactions of previous meetings inform you that medical literature would be just as rich had the majority of your papers never been written. On the contrary, I believe this Society has done splendid work, having had much to do with bringing the practice of obstetrics, gynecology, and abdominal surgery to its present satisfactory state.

It is often necessary for a fact to be reiterated again and again to convince the rank and file of the profession of its truth. A former distinguished teacher of mine once remarked in my presence that he was frequently as much indebted to one who recalled to his mind a half-forgotten fact, as to another who gave him a new one. Certain it is that the writer, who states clearly and forcefully the discoveries of others, often has more to do with their dissemination than the discoverers. I, therefore, congratulate the members of this Society on the excellent papers they have read before it and the fearless way they have been discussed, rather than chide them for not having done better.

The elder Gross predicted that gynecological societies would cease to exist because they would soon exhaust the field of so limited a part of surgery. In more recent years one of the most distinguished of American gynecologists referred to gynecology as a "passing speciality." It has not yet passed and I think the day is far distant when a surgeon properly trained as a gynecologist cannot find enough work to keep him well employed and enough income to secure him the comforts of life in any populous district of the country, if he cares to limit his practice to the speciality. But it is a fact that the diagnosis and operative treatment of gynecologic conditions, aside from

malignant disease, has become so satisfactory, that radical improvements are not to be expected.

One method of diagnosis, vehemently recommended by some operators in recent years, seems to me to be seldom needed. I refer to the opening of the uterus. The greater one's familiarity with intra-abdominal conditions, the less frequently he finds it necessary to do an exploratory abdominal section. Hysterotomy will find more frequent employment in the hands of the general surgeon who has broadened his field to include gynecology, than in the hands of a gynecologist who has studied at the feet of a master of the art.

It is from the laboratory rather than the operating room that further success in dealing with cancer is to be expected. The importance of early diagnosis and operation is thoroughly recognized by the surgeon, if not by the laity, and the radical and painstaking operations now performed have nearly reached the limit as to thoroughness. Further experience with radium has pretty well demonstrated the position it should occupy in cancer therapy. That it is a distinct addition to our munitions for warfare against the disease, and that it should be given a trial on all cases too deep-seated for *x-ray* treatment, and for any reason not amenable to complete removal by the surgeon's knife, few will deny; that it should take the place of the knife in the hands of the experienced surgeon when he considers the case operable, few will claim. In estimating the results of a given treatment of cancer it is to be remembered that cancer differs materially in the degree of its malignancy. Dr. Harvey Gaylord has called attention to the fact that some of the tumors with which he succeeded in inoculating mice had such a low degree of malignancy that even incomplete removal served to cure the animal. I believe that every surgeon of ten or more years experience in dealing with cancer can recall cases in which at the conclusion of his operation he felt that it had been inadequate, and yet the patient lived many years without a recurrence; and can recall others in which, when the operation was completed, he was well satisfied with his efforts, and expected a more or less lasting immunity, only to be disappointed by a rapid recurrence and a fatal termination at an early date. For this reason, it is never wise to claim unusual results in the treatment of cancer by any method until the cases are large in number and have survived the treatment a considerable number of years. It seems probable that the limit of usefulness of the *x-ray* has not yet been reached. There is no reason to believe that there may not be further improvement in both apparatus and technic.

The treatment of fibroid tumors of the uterus by the *x-ray* has

shown some satisfactory results as far as the relief of symptoms go. It has long been known that, without precautions, he who makes frequent use of the x-ray, will be rendered sterile by its action on his testicles. It may be that the action of this agent on fibroids is by means of its destruction of the function of the ovary. If this be true, its usefulness will be limited to that class of cases which in former years have been benefited by removal of the ovaries. The surgical treatment of uterine fibroids in the hands of an operator skilled in pelvic surgery is now so successful and satisfactory in every way, that any other form of treatment will have to show brilliant results to supplant it.

The medical profession through the works of Rosenow and others has learned much of importance of chronic septic infection caused by small foci of infection situated particularly in the tonsils and at the roots of the teeth. My distinguished uncle, Dr. Thaddeus A. Reamy, a number of years ago, reported cases of cure of rheumatism by curing septic endometritis.

Much interest has been shown in the toxemia due to colonic stasis. I have read two short papers on this subject before the Society, and I see no reason for changing the opinions expressed in them, which may be summarized as follows: *First*, preventive treatment is of prime importance. *Second*, medical and hygienic treatment bring relief in a large proportion of cases. *Third*, in a smaller number of cases some form of surgical treatment offers the only hope of relief. *Fourth*, ileosigmoidostomy gives the best results. *Fifth*, it is not usually necessary to remove that portion of the bowel whose function is eliminated by this operation.

Since our last meeting, I have tried lateral cecosigmoidostomy on three cases. In none of them has it given the relief of symptoms I had become accustomed to expect from ileosigmoidostomy. I made the opening between the cecum and the sigmoid of ample size, but have every reason to believe that a large part of the bowel contents continue to travel by the old route. I believe this to be due mainly to the fact that the peristaltic wave travels in opposite directions in the cecum and in the sigmoid.

The fact that the originator of the short-circuit operation and some of his followers have in their enthusiasm carried its use beyond the realm of reason, is no argument against its use when the indications for it are clear and distinct.

The comparatively satisfactory results obtained by modern surgical technic has led to renewed interest in anesthesia, preparatory treatment and after-treatment in order that the recovery of the

patient may not only be as sure as possible, but as comfortable and as rapid as possible. As to anesthesia, there are two tendencies which seem to me to be quite opposed to each other and to demonstrate a fact most of you have, doubtless, observed that comparatively few medical men think for themselves. We claim to be the most progressive of all professions, to recognize no authority but demonstrated truth; but, as a matter of fact, the great majority of us follow like a flock of sheep some wether, that for the time being, is wearing the bell of fame.

On the one hand, we have surgeons and hospitals that employ nurses instead of physicians to administer anesthetics. On the other hand, we have physicians who will have an anesthetic given only by a graduate in medicine, who makes a speciality of its administration. To which class the average man belongs depends on whose shrine he happens to be worshiping at the present time. One will claim that a nurse can be taught to give an anesthetic as well as a physician, on the same principle that the foreman of a factory tells you that one need not be a skilled machinist to make some one part of an automobile. I have seen many women doing fancy needle work that could sew better than I can, but I have never thought it wise to employ one of them to sew up my incisions. I have seen many butchers that could use a knife with more dexterity than I, but I have never called one of them to open an abdomen for me. I still believe that my medical education is of some value to me as an operator. I am not inclined to go back to the days of the barber-surgeon when the medical man stood by and told him what to do. I prefer my anesthetics given by someone whose knowledge of anatomy, physiology and therapeutics enable him to meet emergencies that may arise without much direction or supervision on my part. Aside from the interest of the patient, there are two reasons why doctors, instead of nurses, should administer anesthetics. The first is, there is not enough work for the doctors now. They are entitled to the income they can legitimately earn in this way. The second is, that having a nurse do this work encourages her to prescribe and do other things for which she is not trained. The others claim that the administration of an anesthetic is so important that only a very few men or women are competent to do it. The professional anesthetist is a useful member of the profession, but naturally likes to magnify his calling, so he provides himself with expensive and complicated apparatus that makes the operating room look like the inside of a submarine. Then on the same principle that you blindfold a horse to get him into a place he fears to go, he gives the patient a hypo-

dermic or morphine, so he will not be scared to death at the sight of them. The anesthetic must be a mixture of agents. Old-fashioned ether or chloroform are not up to date at all. Too many people understand pretty well how to use them. I do not claim that ether or chloroform are such perfect anesthetics that none better will ever be discovered. I do not claim that nitrous oxide is not a useful agent and that there are cases where it is preferable to either of the others, but I do claim that it has not been proved that gas is safer than ether as the routine anesthetic for major surgical operations; the fact that its most ardent advocates insist that it be given by an expert is evidence that it is not; that ether properly given is always a stimulant; that it is safer for a patient to be so anesthetized; that there is no reaction to trauma, when less completely anesthetized; that ether vapor at the temperature of the body is less irritating than if cooler; that carbonic acid gas is as useful an adjuvant to ether as nitrous oxide, and is the natural stimulant for respiratory centers; that the seriousness of the after-effects of ether has been exaggerated in the mind of the profession; that the dangerous after-effects can be reduced to a minimum by rendering the patient's urine alkaline in reaction before and after administration and by administering it in accordance with the beliefs above expressed. I further believe that public hospitals should have professional anesthetists on the staff not so much to administer the anesthetic as to teach interns how to do so.

I am glad to see that these views, which I have long held, have the support of Dr. John Bryant of Boston and Prof. Yandell Henderson of Yale Medical School. (See *Journal of A. M. A.*, July 3, 1915.)

One of the improvements to be made in the future of surgery is a more accurate way of estimating the surgical risk in a given case. It is well known that certain individuals withstand operation from which a majority of people would die. Others succumb where the majority would survive. We are able to recognize some of the conditions of the heart, the lungs and the kidneys that render one a poor surgical risk. A knowledge of the blood pressure is also valuable. But there is still something that eludes our present means of investigation. Because our methods of estimating the risk are still incomplete and imperfect, is no reason for neglecting to use those we have to the best advantage. The surgery that the masses receive is not the surgery of a few selected leaders with special endowment by nature, special training and special facilities. I think it can safely be said that the average patient, when she consults a surgeon, has her heart and lungs not very carefully listened to by

the surgeon himself. Then she is sent to the hospital and the interne is instructed to examine the urine. This, by some interns, is conscientiously done; by others, I am sure, the examination amounts to little more than looking at the urine. Not infrequently the recognition of some abnormality other than the one for which the operation is to be performed, would lead to its postponement and suitable preliminary treatment would change the risk from a very poor one to a comparatively good one, and this in turn would give a lessened mortality rate in the year's work.

This leads me to repeat what has often been said by others that there should be more and better team work between the surgeon and the internist; and leads me to add that if more surgeons did family practice for five years before specializing they would less frequently need the advice of a skilled internist and more frequently avail themselves of it.

In the after-treatment the internist may assist in the early recognition of some complication, such as pneumonia, but the surgeon must be the supreme authority in the treatment of the case. The operation having been done, the case is his, and he must assume the responsibility of its treatment. There is often more than one way of attaining a desired result. One man may be competent to secure it in one way, another in another. There may be two good roads from Pittsburgh to Cincinnati. I might be able to drive you safely and comfortably over one road, someone else may be able to do the same over the other, but if you employ us both and we decide to compromise on a byway that runs half way between the highroads, it will be doubtful if your destination is ever reached. "Too many cooks spoil the broth" and too many doctors have hastened many a patient to an untimely end.

The after-treatment of a patient subjected to abdominal section is still worthy of some thought. "Safety First" should be the rule of the surgeon as well as the railroad man or an automobilist. Minor considerations are comfort (of the patient) and speed (of recovery). I believe that it is reasonable to assume that every abdominal section is followed by peritonitis. In the vast majority of cases it is so slight in character that its symptoms are scarcely perceptible, and an early recovery is assured from the beginning. There is every grade of severity from this, to the case that is doomed to die from peritonitis when the incision is closed. This supposition is made reasonable by the common knowledge as to the reaction of the peritoneum to traumatism, by the known omnipresence of germ life, and by the frequency of the existence of peritoneal adhesions in

patients who have recovered. If this supposition is correct, the after-treatment is really the treatment when the patient has recovered from shock and the immediate effects of the anesthetic, of peritonitis. The fact that many cases require practically no treatment is irrelevant. The same thing may be said of many cases of acute infectious diseases.

In the Transactions of this Society for the past year is to be found a very thoughtful and instructive paper by Dr. Crile. He shows that many of the symptoms of peritonitis, the arrest of peristalsis, the intestinal distention, the muscular rigidity, the peritoneal exudate are protective measures, directed toward limiting the area of infection. There can be no question as to the truth of this interpretation of the symptoms, but to the treatment this line of thought leads him to adopt, I cannot give my unqualified approval. I say this with hesitation, for I know that Dr. Crile's reputation as a surgeon, as an observer and an investigator, is both great and well deserved.

He says: "If the body-wide disturbances caused by peritonitis are adoptions for defense, then we must conclude that death is caused by an excessive discharge of the body's store of energy in maintaining this defense. Our problem, therefore, must be to discover some means by which the method of defense evolved by nature may be maintained at the same time the energy of the body is conserved as far as possible." Because the body makes strenuous efforts to repel the invasion of the foe, it does not necessarily follow that if death ensues it is due to the exhaustion of the body by these efforts. Belgium made strenuous efforts to repel the German army, but it was not these efforts that destroyed her. Her destruction occurred because her efforts were ineffectual. Nature makes every effort to limit a peritonitis. If her first line of defense is effective the patient is almost sure to recover. The inflammation may go on to suppuration, and if the resulting abscess does not find an exit for itself, or the surgeon fails to evacuate it, the body may wear itself out in the fight. If the first line of defense is not effective another barrier may be erected. Now the enemy is in possession of a larger territory, the condition of the patient is more grave, but it is rare that exhaustion follows. The peritoneum presents an immense surface for the absorption of toxins. If all or even a very large part of it becomes infected, absorption is so rapid that death is the rule; not because the body has exhausted itself in trying to limit the peritonitis, but because the efforts at limitation have failed. The whole body is overwhelmed by the foe. There are several ways in which one nation may help another when a foe invades its territory.

First, it may attack the foe in its own way. *Second*, it may help keep it confined to a limited area. *Third*, it may sustain its ally and leave it to do its own fighting.

In treating peritonitis any one or all of these methods may be employed. It is the consensus of opinion that the first method is the best in the treatment of peritonitis originating in the appendix. The surgeon attacks and destroys the organ in which the enemy is entrenched. If, in so doing, he breaks down the peritoneal line of defense, it matters little—the main army of invasion has been destroyed.

With equal unanimity the profession makes use of the second in the treatment of peritonitis of tubal origin. Every effort is made to assist the peritoneum in its efforts, which are usually successful, to limit the inflammation to the pelvis. Surgery is reserved for the results of the infection; it is not directed against the infection. In other words, we remove the dead from the battlefield after our fight is over.

Dr. Crile would teach us that morphine is not only of great value in the second method, but is our main weapon in the third. That morphine arrests peristalsis and favors the formation of adhesions is not questioned. That it delays absorption, I am willing to believe, and I should be inclined to attribute the protective influence he has observed in the brain, liver and suprarenals to this action rather than to the specific action it has on these structures. He says, "I have found that infection produces in the brain, the suprarenals and the liver histologic changes which are identical with the changes which are characteristic of exhaustion from any cause—running, fighting, trauma, etc. Let us paraphrase this statement to read as follows: Dr. Crile has found exhaustion from any cause—severe exercise, trauma, etc., to produce changes in the brain, liver and suprarenals identical with those caused by peritonitis, *i.e.*, a systemic infection. This gives us the thought that severe exertion gives rise to a poison that has the same effect on the brain and other structures as an infection. The fact that severe exertion forms a poison is borne out by the observation of Prof. Martin Fischer that college athletes in perfect health show albumin in the urine after a severe contest with their fellows. That it is a poison whose influence on the function of the kidneys can be readily counteracted is proved by the further observation that if the athlete partakes freely of oranges before engaging in the contest albumin will not manifest itself.

At one time the profession, following the teaching of Alonzo Clark,

employed opium as the routine treatment of peritonitis. That was before the days of abdominal surgery. Any treatment that relieves one or more of the prominent symptoms of a disease, even temporarily, will become the fashion for a time if it be enthusiastically recommended by some prominent member of the profession. As for example, the treatment of typhoid fever with antipyretic drugs. If it has some real merit, the treatment will last for some time, until something else is brought forward to take its place. If it is a real remedy, it will stand the test of time even though its action cannot be scientifically explained. This was true of quinine. After its value in the treatment of malaria was once recognized, its use was never abandoned, though many years elapsed before the cause of malaria was discovered and the action of quinine satisfactorily explained.

The use of opium in peritonitis held sway for a number of years, but was abandoned. This would indicate that it had some merit, but that it was not entirely satisfactory. It was surgery that displaced opium. When opium was at the height of its favor, there was no such thing known as removing the appendix or gall-bladder or as closing the typhoid, duodenal or gastric ulcer, thus removing the source of infection. The only thing to be done was to let nature wall-off the infected area, as a captain at sea when his ship leaks may be able to do nothing more than limit the water to one compartment. Opium not only held the intraperitoneal structures quiet while nature glued them together, but it was and still is the best known drug to relieve shock following perforation. If the aid of surgery is not to be evoked the Alonzo Clark treatment is, doubtless, still the best. Lawson Tait taught that opium was injurious after operation; that early purgation was "a consummation devoutly to be wished." It may be that Tait in his enthusiasm magnified the deleterious effects of opium as well as the beneficial effects of early purgation. Here, again, the fact that this treatment was almost universally adopted and continued in vogue for a number of years is evidence that it possessed some merit.

Let us see if we can explain what merit it possessed and why it is not popular to-day. It was based on the following assumptions: *First*, that fluid in the peritoneal cavity after an operation was an excellent culture medium for germs; *second*, that as the peritoneum readily absorbs salt water, the contents of a parovarian cyst and the more fluid constituents of blood; and, as ascites can be reduced by saline purgation, he could secure the absorption of fluid in the peritoneal cavity subsequent to operation by purgation, thus draining

the peritoneum through the bowels, as he expressed it; *third*, that opium was contraindicated because it rendered purgation more difficult or impossible.

We all recognize that his first assumption was correct, otherwise we would never use drainage. In his second he failed to take into account the fact that a damaged peritoneum does not absorb fluids as readily as a healthy one and that it is the damaged peritoneum that pours out the fluid, and causes the necessity for drainage.

But is there not some other way in which purgation may have been beneficial? It is known that the intestinal tract contains many germs, and that under certain conditions these germs are very harmful. For instance, in intestinal obstruction, the contents of the bowel above the obstruction becomes poisonous. If, after the obstruction has existed some time, it be relieved and the retained contents be allowed to enter the healthy bowel, death will usually ensue. When the bowels are overdistended with gas and peristalsis is paralyzed as a result of peritonitis, practically the same conditions exist within the bowel as when a mechanical obstruction is present. The value of gastric lavage in such a case is not altogether due to the rest it gives the patient. Opium would give the desired rest. Lavage removes quantities of poisonous fluid. Before I was familiar with the benefits to be derived from washing out the stomach in such cases, I have observed patients in whom the bowels resisted all efforts at purgation for a number of days, and when they finally yielded there was every evidence of the absorption of toxic material and death ensued in about twelve hours. It may be said that it was approaching death that permitted the bowels to move. I can only answer that it was not the clinical picture, and if one variety of obstruction produced a poison, it is reasonable to presume another variety will do so. Purgation removes the poisonous contents of the bowels in the natural way. This being true, it is a valuable method of treatment when peristalsis can do no harm. Peristalsis is not harmful except that it scatters infection. Therefore, if there be no infection to scatter, or if it has already been spread throughout the peritoneal cavity, it is harmless. In the majority of operations, excepting simple drainage, the bulk of the infection and the source of supply have been removed, there is not enough left behind to cause serious results, if it be somewhat scattered, and the operative procedure itself has scattered it sufficiently to make it impossible to restrict it to any very limited area. Under such circumstances it seems to me, that while purgation may not be necessary, it is not contraindicated. If nature stops peristalsis and distends the bowel

with gas in order that adhesions may form, then purgation, by keeping up active peristalsis and causing the gas to pass, is an efficient method of preventing adhesions following operation. Probably the reason why purgation became somewhat obsolete is not because it did not serve a good purpose, but because the improvement in surgical technic made it less essential to the patient's recovery. That in the blind following of the dictum of a leader patients were allowed to die from exhaustion, when they might have been saved by the judicious use of a sufficient amount of an opiate to secure needed rest and relief from pain, is probable. Personally I have always endeavored to protect the patient from this misfortune by the use of codein and chloral; I have usually found they answer the purpose and do not produce the nausea and constipation which so frequently follow the administration of morphine to those unaccustomed to its use.

Dr. Grear Hill Baker, of San Antonio, Texas, tells me that he gives his patients a hypodermic of pituitrin at intervals of six hours after they have been subjected to an abdominal section. At the end of thirty-six hours he administers a purgative enema, and this causes a free evacuation of the bowels without the administration of any other purgative.

The Ochsner treatment of appendicitis was founded on accurate clinical observation and logical reasoning; but, I am sure, that its promulgation caused the death of many people because it was applied when prompt surgical intervention offered the only means of cure. I am fearful that the revival of the opium treatment of peritonitis will have similar results. It is not so many years ago that the surgeon, when called to see a case of appendicitis, nearly always found the symptoms more or less completely obscured, and the medical attendant as well as the patient misled as to the gravity of the situation by the free use of morphine as a mode of treatment. It is to be hoped that this condition of affairs will not recur.

The use of vaccines in the treatment of infections has already given some brilliant results and promises much for the future.

OBSTETRICS.

I recall reading an article, about the time I graduated in medicine, by the late Dr. Robt. Harris, of Philadelphia, in which he showed that up to that time the Cesarean sections performed by American surgeons showed a greater mortality rate than those performed by American cows. Certainly, we have traveled far since that time.

But is not the advance more a surgical than an obstetrical one? When a Cesarean section is performed the case is either turned over to a surgeon or the obstetrician becomes, for the time, a surgeon. It is purely a surgical procedure. Has obstetrics itself in that time made rapid strides? I have not practised obstetrics for a number of years and may be mistaken, but it seems to me it has not. True, the laws of asepsis are more rigidly enforced than they were then; more patients go to a hospital for delivery now than they did at that time. Pituitrin has been introduced and twilight sleep is abroad in the land. It is claimed by some good observers that the physiological action of pituitrin is identical with that of ergot and that twilight sleep has benefited some sensational magazines more than it has parturient women. But the family physician of to-day is little better prepared to meet and grapple with the real problems of obstetrics than was his predecessor of a quarter of a century ago. And it is by the family physician that the majority of cases are attended. One of the main reasons for unsatisfactory progress is that obstetrics is inadequately taught at the medical colleges. This is not so much the fault of the teachers of obstetrics as it is the management of the schools. They raise money for full-time men in other departments, but do not place enough money at the disposal of the obstetrician to enable him to devote a sufficient amount of his own time, or pay for the time of an able assistant. Their fellow professors often fail to appreciate either the importance of the subject or to supply the means necessary to teach it properly. I overheard a teacher tell a class, when he had come to fill the hour for the obstetrician, who could not be present, that they need not worry over his absence as "babies had to all enter the world through the same passage." As a consequence of this attitude men are graduated with an imperfect knowledge of obstetrics and little enthusiasm for its practice. Most of them will tell you they "take obstetric cases only as a means of holding their families."

The remedy for this state of affairs is the education of a larger part of the laity to the necessity of having a good obstetrician and a willingness to pay him a fee commensurate with the time and skill they demand.

The exploitation of anything new in medicine by the press, before its proper status has been carefully worked out by the profession, is always unfortunate and the publicity given to twilight sleep is no exception to the rule. By the judicious use of morphine and chloral in the earlier stages and of chloroform in the later, labor has for years been robbed of its severest pangs. If the addition

of scopolamine enables a smaller dose of morphine to relieve the pain, then the latter will interfere less with uterine contractions. But in the published reports of cases we find that efforts to secure twilight sleep result rather frequently in the birth of "blue babies." "Safety First" is a good slogan for the obstetrician. Safety not only for the mother but also for the child. It is claimed that though the woman in labor gives every evidence of pain during the twilight sleep, she has no recollection of it afterward. It seems hardly necessary to give a drug for this purpose; for the speed with which the joy of maternity overshadows the pangs of parturition is almost proverbial. Were it not so the number of parents with only one child would be much larger than it is.

The most that can be said for twilight sleep at the present time is that it is worthy of further investigation in the hands of those competent to make it.

The treatment of eclampsia is still the subject of considerable discussion. Last year we had two papers contributed on this subject: one advocating the rapid evacuation of the uterus by vaginal Cesarean section, the other advising the so-called "Dublin Method," which makes rapid delivery a matter of minor importance. The statistics quoted by Dr. Leighton proves conclusively what has long been my opinion, that emptying the uterus is not the most important treatment of patients in eclampsia. The statistics of those who favor it give a mortality rate of from 16 to more than 38 per cent., while Stroganoff and Tweedy secured a mortality rate of 6.5 and 8.11 per cent., respectively. Of course, the pregnancy causes the poisoning of the patient and emptying the uterus stops the formation of the poison, but when a man is in a boat that is leaking, it is important to stop the leak, but to pump out the water that has already gained ingress is more urgent. This is true in eclampsia. The most important thing is to get rid of the poison that has already been absorbed and is circulating through the system. The stopping of the formation can safely be delayed while this is being accomplished.

In the immediate control of the convulsions, I wish to again emphasize the use of a drug that is much feared by many practitioners and, consequently, when employed by the majority of men, is used in insufficient quantities to produce the physiological effects and is, therefore, declared useless by them. I refer to *veratrum viride*. Another reason why many physicians do not obtain the desired results from this drug is that they use it simultaneously with morphine. I want to emphasize as strongly as possible, that morphine is the physiological antidote of *veratrum viridi*. In a robust woman it is

usually not worth while to begin with a dose of less than 30 minims and 10, 15 or 20 minims more are to be given at one half-hour intervals until the pulse is brought down to 70. I do not claim that this will relieve every patient, nor do I know any other one treatment that will do so. It is particularly indicated in those cases in which the pulse is full and bounding. As the late Dr. A. B. Isham of Cincinnati pointed out, it not only produces its well-known effect on the circulation, but is a diuretic and causes the liver to pour out large quantities of bile; therefore, it is one of the best agents known to increase elimination.

In a paper by Dr. James J. Hogan, of San Francisco, published in the *California State Journal of Medicine* in Feb., 1915, the value of alkalies as a prophylactic measure and the use of Fischer solution as a method of treatment is clearly stated. It cannot be claimed that this method will save every case, because sometimes the kidneys and liver have already been irreparably damaged. But the value of keeping the urine alkaline in reaction as a prophylactic measure I do not think can be overstated. The indication undoubtedly is to eliminate the poison and veratrum with purgation and the use of Fischer's solution appear to meet this indication better than any other means at our disposal.

If these comments on the present tendencies in the practice of gynecology and obstetrics have furnished you some food for thought my object in presenting them will have been accomplished.

FURTHER EXPERIENCES WITH LOCAL ANESTHESIA IN HERNIOTOMY.*

BY

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At the Providence meeting of this Association in September, 1913, I reported twenty-eight operations for the radical cure of inguinal hernia performed under local anesthesia. This paper was published November, 1913, in *THE AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN*. Since that time I have performed ninety-six additional operations by the same method. The following is a tabulation of all operations:

*Read before the Twenty-eighth Annual Meeting of the American Association of Obstetricians and Gynecologists at Pittsburgh, Pa., September, 1915.

- 97 operations for radical cure of inguinal hernia.
- 6 operations for radical cure of strangulated inguinal hernia.
- 7 operations for radical cure of femoral hernia.
- 5 operations for radical cure of strangulated femoral hernia.
- 3 operations for incarcerated femoral hernia.
- 2 operations for incarcerated umbilical hernia.
- 5 operations for incisional hernia.
- Total 125. There have been no deaths.

My further experience with this method of performing herniotomy has convinced me that, whenever possible, such operations should be performed under local anesthesia. The only exception to this rule should be in case of herniotomy in children and where the operation must be performed in uncontrollable nervous adults. The latter exception in actual practice is not as frequent as one would think, for the reason that most nervous individuals can be controlled by carefully explaining to them the nature of the operation and the reasons for operating under local anesthesia.

A preliminary hypodermic injection of morphine and scopolamine or pantopon and scopolamine is usually sufficient to allay all nervousness and the operation can proceed even in nervous patients with the same facility as under general narcosis. In only three of the operations herewith reported was it necessary to complete the operation with a slight amount of ether; these were among the earlier operations.

Local anesthesia recommends itself for hernia operations because it insures the patient absolute safety. No other form of anesthesia gives the same degree of safety as does the modern Braun technic of local anesthesia. When a surgeon has mastered the few principles which are necessary for success in local anesthesia he will soon abandon all other anesthetics in herniotomy.

The objections which have been raised against this method have been:

1. Psychic disturbances.
2. Pain during the operation.
3. Inability of the surgeon to do complete work.
4. Greater danger of infection.
5. Prolongation of the operation as compared with general anesthesia.

1. As to *psychic disturbances*, in my experience, this has been a negligible quantity. Some of the patients have been nervous at the outset of the operation, but I found when the various steps have been previously explained to them and when they are told the

truth regarding the amount of pulling which they will experience during the operation, they are satisfied and the operation is performed with no particular difficulty. I found that preliminary hypodermic injections of morphine and scopolamine help in such patients who seem apprehensive of the operation. The routine administration of preliminary hypodermic injections, has been abandoned. I found them unnecessary, the local anesthesia being of sufficient intensity to preclude their use. I have never observed any serious psychic shock during these operations; the pulse rate usually remaining the same as it was before the operation began.

2. *Pain during the Operation.*—A greater familiarity with the method enables the operator to thoroughly anesthetize the parts and the operation may be completed without pain. A freshly prepared solution; a thorough injection about the site of operation; a wait of ten to fifteen minutes after the injection; some care in handling the tissues together with supplementary injections in the subperitoneal space around the neck of the hernial sac will render the operation painless. Sometimes a little pain is experienced when an intestinal adhesion to the interior of the sac is encountered. Such adhesions can be separated without pain by supplementary injections and care in dissecting them free. To my mind the best evidence that these operations are done in a painless manner is that one patient will send another for the same operation.

3. *Inability of the Surgeon to do Complete Work.*—This factor depends entirely upon good anesthesia. A patient who is only partly anesthetized, because of imperfect technic, will not allow satisfactory work. In my experience, owing to the relaxation of the muscles and fascia, more satisfactory work and better dissection may be made than under general anesthesia. To get the same degree of relaxation under general anesthesia, it is necessary to have the patient profoundly under the influence of ether. In my experience this relaxation has been so great under local anesthesia that it not only permits of the most thorough work, but it also facilitates a most extensive overlapping of the external oblique fascia. I have, therefore, gained the impression that recurrences after such operations are less frequent than under general narcosis.

Thus far in my series of cases I have had no recurrences of the hernia. In thirty cases more than two years have elapsed since the operation. The number is, of course, too small, and the time since operation too short, to form definite conclusions on this point. Sufficient time must elapse in a larger series of cases before this

can be demonstrated; nevertheless, one cannot resist this impression after operating upon a series of hernias under local anesthesia.

4. *Greater Danger of Infection.*—Danger of infection depends upon the sterility of the solution, and the method of injection employed. The solutions can be rendered sterile by boiling. Such solutions should be made from the novocain crystals in salt solution and boiled for three minutes. The adrenalin should be added just before the solution is removed from the flame. Solutions prepared in this way are always sterile and do not irritate the tissues. With the Braun technic the infiltration, the barrier of anesthetic solution, surrounds the field of operation and the incision does not go beyond the infiltrated areas as is the case when the Schleich method is employed. There is more danger of infection and necrosis of tissue with the Schleich technic than with the Braun method.

I have had only one infection, this was due to faulty preparation of the solution.

5. *Prolongation of Operation.*—It has often been said that herniotomies performed under local anesthesia consume more time than when such operations are performed under general anesthesia. This may be true of the Schleich technic. With this method it is necessary to infiltrate the successive layers of tissue before incising them, all of which takes considerable time. With the newer technic the injection and anesthetic effect take less time than is required to put the patient asleep with ether. Regarding the time consumed in the operation, there is no difference between local and general anesthesia.

The method of injecting these solutions consists in using two points for the entrance of the needle. The first one opposite the anterior-superior spine of the ilium and the other about an inch above the spine of the pubes for inguinal hernia. These two points are rendered insensitive by the intradermal injection of some of the solution with an ordinary hypodermic needle. Through these two points the solution is deposited by the aid of syringes having a long needle attached at right angles. The field of operation is surrounded by the solution first under the superficial layers and then under the deeper external oblique fascia. Of late I have also placed some of the solution under the skin along the line of incision. This somewhat shortens the period of waiting after the injection is completed. I have entirely abandoned the separate infiltration of the inguinal nerves as was done in the earlier operation. These nerves seem to be sufficiently anesthetized when some of the solution is deposited under the external oblique fascia opposite

the anterior-superior spine of the ilium. In large scrotal hernias some of the solution is injected downward into the superficial layers of the scrotum. In femoral hernias the inguinal method has always been used and the infiltration is made just the same as for an inguinal herniotomy.

I have never observed the slightest toxic effect from the use of the $\frac{1}{2}$ per cent. novocain and adrenalin solutions which I have employed for these operations. In one double hernia operation I used 12 ounces of the solution. The average amount of solution employed is from 3 to 6 ounces, depending upon the size of the hernia and the amount of superficial fat present. An accurate hemostasis is essential to success, and all pouting vessels should be immediately ligated after the skin incision is made. When this is done the danger of secondary hematoma is eliminated.

Statistics regarding the frequency of hernia show that the condition is very common. According to Coley, who (*Keen's Surgery*, vol. iv) quotes Malgaigne and Werkner, one out of every twenty-one subjects examined in Saxony had a rupture, while the proportion in Belgium was one in every eighty-nine. Berger estimates that the proportion of ruptures in males is 1-14.9 and in females 1-44.7. He gives the average as 1-22 in both sexes. These studies also showed that there was a steady increase in males in the number of hernias during the active period of life, from thirty-five to seventy years. The number of operations which are performed in our hospitals do not in any way equal the number of hernias which should be operated. Mortality statistics show that deaths from strangulated hernia frequently occur.

Total deaths from hernia in the United States were as follows: 1910, 2192 of which 1142 were males and 1050 females. 1911, 2369 total of which 1265 were males and 1104 females. 1912, 2348 total of which 1222 were males 1126 females. 1913, 2424 total of which 1263 were males 1161 females.

The mortality rate per 100,000 is as follows: 1901-1905, 4.02; 1906-1910, 4.01; 1910, 4.01; 1911, 4; 1912, 3.9 and 1913, 3.81.

The frequency of hernia in otherwise normal individuals should make it the most common of all surgical operations. This will only be the case when the entire medical profession will give these patients a method of operation which involves no danger to life and which gives a maximum of cures. These conditions are at present best fulfilled, by the use of local anesthesia in such operations.

DISCUSSION.

DR. JOHN W. KEEFE, Providence, Rhode Island.—My experience is in accord with that of Dr. Jacobson. I began this method of anesthesia in cases of hernia at the time Dr. Cushing, quite a number of years ago at the Johns Hopkins, first spoke in detail of performing hernia operations with the aid of cocain anesthesia, and injecting the ilio-hypogastric and ilio-inguinal nerves. I have done a number of hernia operations with the aid of local anesthesia, and in recent times I have been using morphia and scopolamin previous to using the cocain and adrenalin. I found in certain cases scopolamin seemed to make the patient so excitable that in a few instances I had to put off the operation to another day. It may be, that was due to some idiosyncrasy on the part of the patient, but I have been firmly impressed with this way of anesthetizing the patient for an operation for hernia and believe it is a most desirable method.

I recall a very slight anemic, timid sort of man, concerning whom one would say ordinarily, that he could not stand very much, and after telling him I thought he would suffer no pain with local anesthesia, I was able to do a hernia operation on him with very little disturbance. He had taken ether before for some other operation, and some years afterward he told me that there was no question whatever but that if he had an operation to be done again, that is, for a hernia, he would select a local anesthetic. In every case of strangulated hernia a local anesthetic should be used. Most of the operations for inguinal hernia should be done under local anesthesia. If I were to have an operation on myself for hernia, I certainly would select a local anesthetic, judging from my experience with it.

DR. ALBERT VANDER VEER, Albany, New York.—In a deliberate operation for the relief of hernia, I cannot help thinking what a change has taken place in the professional atmosphere. Looking back to the days when operation for strangulated hernia was the only treatment we could advise for the relief of this condition, and how satisfactory is our present method of cure, carrying but a slight mortality, because of the great advance made in our surgical work.

We have gradually reached a point, when the majority of the profession are in favor of local anesthesia, and yet, at the same time, the subject is not quite settled requiring further consideration not only from our state but national associations.

Dr. Jacobson brought out a number of interesting points in his paper. I am glad to have him assert himself in regard to children. I do not believe local anesthesia appropriate for children. I was glad to have him say it is not absolutely necessary to select the ilio-inguinal nerve itself for the injection. I wish to impress this point: In all our operations we have to deal with patients, intelligent or otherwise, and this is an operation concerning which we can say to the patient, do you select a local anesthetic or do you prefer to take a general anesthetic? Do you prefer to be under the influence of an anesthetic so that you will know nothing about what is going on in regard to the operation? There are a number of individuals who make better patients by following out their desires. A nervous pa-

tient will select a general anesthetic, and will do much better, and it will be better for the operator.

One may say that it is very trivial for me to take your time to speak about the instruments, but it seems to me, that simplicity holds good. We have a variety of syringes that have been suggested for local anesthesia, and I am convinced that a plain glass syringe, with glass piston, with a point long enough and imitating that of the ordinary hypodermic syringe, is the safest instrument for us to use. The doctor may have had greater success than I, but it has been to me a source of disappointment to see the best of our nurses unable to take care of trocars and keep the syringes in good condition. I feel that the simplest instrument I can have, one that can be sterilized and put in good condition before the operation so that when it comes into my hands, I know and feel sure it is going to work, is the instrument to use. There is no disappointment about it. While this is a beautiful instrument to look at, and very much like others, I hope the doctor will not be disappointed at any time in finding it not in good condition.

As one of the older members of the Association, I am glad to be with you to-day. I am pleased to notice there is such an amount of vigor, vim and earnestness manifested. I am profoundly thankful that such an organization as this has existed for the past quarter of a century. As I look over my library I notice the number of volumes that this Association has produced. I remember them very distinctly. I feel a sense of gratitude to know that there is contained in them a vast amount of interesting and instructive literature, and I look to you gentlemen with great pleasure because your work has been recognized in the various medical journals, and particularly in the journal that gives you official recognition by publishing your papers and discussions, I believe that you will go on and solve the unsolved questions before you, and I wish you all success in the work you are doing. (Applause.)

DR. WILLIAM H. HUMISTON, Cleveland, Ohio.—I was much interested and gratified to listen to Dr. Jacobson's paper, and anyone who has seen him operate under local anesthesia will come away convinced that he is a master of that art. I think I was one of the pioneers in local anesthetic work. Some thirty years ago I did a great deal of minor work in gynecology under cocain anesthesia. I published my paper at the Washington meeting of the American Medical Association some twenty-five or thirty years ago.

In following an exclusive method of anesthesia, I think one is inclined to make every case submit to that form. I found out that when I was inclined that way I was using poor judgment many times. You must select your cases. A nervous run-down woman, although she does not suffer pain, mentally suffers, and makes a fuss all the time, so that it is not a favorable situation for the operator to be in, in order to do good rapid work. These cases should be selected very carefully. We had a good many disturbances of respiration and circulation, and the nervous system was slow in recovering from these local anesthetic operations, but as soon as we recognized individual

difference, and selected our cases and used a general anesthetic when indicated, we had better results.

Of course, we used at that time cocain and not the present method of novocain. We used a 4 per cent. solution which sometimes would give us disturbances of respiration and very rapid heart, but I soon learned to control that by giving half an ounce of whiskey and $\frac{1}{30}$ grain of strychnine half an hour before the operation. I gradually reduced the strength until we were using 1 per cent. solution. After adopting the 1 per cent. solution we did not have these symptoms or disturbances follow the injection of any reasonable amount of the anesthetic. We were able to do, and still do, in cases that are suitable, curetments, trachelorrhaphy, and perineorrhaphy under local anesthesia, but I only use it in about 40 per cent. of my cases. For the other cases I think a general anesthetic is preferable.

DR. JACOBSON (closing the discussion).—There is very little to add to what I have already said. I have taken up and answered most of the questions in the paper. I do not think we ought to speak of local anesthesia without meaning the modern technic of Braun. We ought to eliminate cocain entirely on account of its danger. When one becomes familiar with the Braun method, it will prove to be a great source of satisfaction.

My plea to-day is that more cases of hernia should be operated upon, as we can now assure such patients absolute safety in operations. There are many more cases of hernia walking the streets than are operated. When this is thoroughly understood by the many who wear trusses, and who are usually the active wage-earners of the country, they will gladly submit to operation, and in this way many deaths can be prevented and the usefulness of these people increased.

Regarding the syringe which I have exhibited, while I think a glass and metal syringe is much nicer owing to the fact that you can see the solution during injection, yet this is not an essential part of the technic. My syringe can be boiled with the instruments and will not break. If it does break or wear out, you can buy a new one for what it costs to repair one of the glass syringes.

REPORT OF A CASE OF A GALL-STONE CAUSING
INTESTINAL OBSTRUCTION AND VOLVULUS.*

BY

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(With one illustration.)

I REPORT this case to place upon record the history of a patient who had gall-stones for a period of eighteen years. There were few symptoms during this period which could be regarded as at all serious until the last. The symptoms began three months before death, the attack ending by a stone finding its way into the small intestine, causing obstruction and this, in turn, caused volvulus.

To men engaged in abdominal surgery, as the members of this Association are, I would not presume to make any suggestions regarding the early management of diseases of the biliary passages. I desire, however, to remind them of the necessity of always being upon the alert in this class of cases. These patients and, especially, their family physicians must be warned and reminded of the many dangerous complications that may develop in any of these cases. This case may emphasize the danger of delaying operation and serve to point the way to how a fatal termination in long standing gall-bladder diseases may be avoided. This campaign of educating the profession is necessary because a large number, if not the majority, of them treat these cases medically and advise against surgical intervention. The case to be reported illustrates in a forceful manner that all gall-stones cases are serious in character as long as the patient carries the gall-stone, even though patients do not have frequent attacks of pain.

It is very unusual for a gall-stone, the size of this one (almost egg-shaped, $2\frac{1}{4}$ inches long, $1\frac{1}{8}$ inches in diameter; the long circumference $5\frac{1}{2}$ inches, the short circumference $3\frac{1}{2}$ inches), to find its way into the small bowel and cause intestinal obstruction. There are a number of cases reported in which a large gall-stone has entered the bowel and caused obstruction. This complication develops, usually, a long time after the acute symptoms, produced by the gall-stones, have subsided and the cause of the obstruction is not suspected until the stone is found at an operation or when an autopsy reveals its presence.

*Read before the Twenty-eighth Annual Meeting of the American Association of Obstetricians and Gynecologists at Pittsburgh, Pa., September, 1915.

The history of my case, beginning with the first attack following a self-induced abortion in 1897, eighteen years previous to the obstruction, is of unusual interest in view of the development of subsequent complications. After the attempt to produce the abortion, the patient became ill. She treated herself for three days, after which time Dr. F. M. Solar, of Cincinnati, was called. He found the patient had been bleeding a week. There was a foul, bloody, discharge from the vagina. The uterus still contained a portion of the secundines. Patient had fever and rapid pulse. The abdomen was distended and very tender in the region of the gall-bladder.

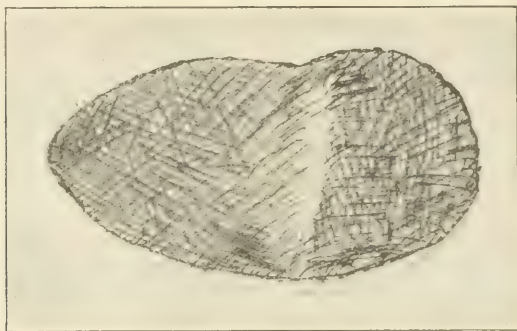


FIG. 1.—The actual size and shape of the gall-stone. The light space across the drawing represents the line of demarkation where different concretions have united while yet in the gall-bladder. The specimen is shaped somewhat like the gall-bladder which evidently had contracted over it before the stone ulcerated through into the bowel.

Domestic remedies taken to evacuate the bowels, had failed. The attending physician used various drugs for the same purpose, but without the result desired.

At the time of my first visit it was impossible to determine the cause of the obstipation. The septic condition, from the incomplete abortion was considered of sufficient importance to demand immediate emptying of the uterus. Patient was at once removed to Christ Hospital and operated upon. While the patient was under the anesthetic, she was placed in the extreme Trendelenburg position and several high enemata, through a Langdon tube, were given. This treatment was only partially successful, but brought away much flatus, which greatly lessened the abdominal distention and relieved the patient, greatly. Two days later a good evacuation was secured and convalescence established. The patient then complained of pain in the region of the gall-bladder and of soreness only in other

parts of the abdomen. When the patient was under the influence of ether, it was easy to make out an enlarged gall-bladder.

The patient made a very satisfactory recovery, leaving the hospital in two weeks. She had a healthy baby in about two years after the illness just described, and two years later another miscarriage, without complications. After the last incident, she rarely complained of more than a little discomfort from gas or indigestion. She performed her household duties, which were many and not very light.

Reviewing the history of the case in the light of subsequent developments, it appears plain that it was the disease in the gall-bladder and not sepsis from the abortion, which produced the obstipation in 1897. While, at that time we were aware of the existence of an enlarged gall-bladder, we were in doubt as to the exact cause of the marked obstipation and rather blamed the abortion for it.

The patient seemed in good health until the middle of September, 1914, when Dr. Solar was called to see her. He diagnosed gall-stone colic and administered a dose of morphine hypodermically. The next day, he found the patient sitting in an easy chair and, aside from soreness and tenderness in the region of the gall-bladder, she said she was apparently well. From this date until her last sickness, she suffered more or less from indigestion and discomfort in the abdomen. She did not send for the doctor until Friday morning, January 1, 1915.

The patient then complained of great pain in the epigastric and gall-bladder region. She attributed this to a heavy midnight supper.

Diagnosis.—Gall-stone colic. The doctor gave a hypodermic of morphine and prescribed a dose of castor oil. The bowels did not move until Monday, January 4, 8 A. M. She then had a free evacuation. After that the bowels refused to move in spite of diligent and persistent effort to evacuate them.

January 6, at 3:30 A. M. the patient was alarmingly ill. She complained of severe pain in the abdomen. Intestinal peristalsis was marked. From this time on all of the symptoms became greatly aggravated; she suffered much and her condition was bad. The abdominal distention increased rapidly and she vomited several times during the forenoon. When the writer saw the patient at 1 P. M., January 6, the abdominal distension was enormous, pulse very feeble, skin cold and clammy, vomit had fecal odor and prostration very marked. Patient's condition was very grave. Acting upon the conviction that every patient having intestinal obstruction, and who is not in articulo mortis, should be given a chance to live by opening

the abdomen, the patient was removed to Bethesda Hospital when a celiotomy was at once performed.

Upon opening the abdomen below the umbilicus, 4-inch incision, a pint or more of peritoneal fluid escaped. The intestines were very much congested and quite dark in color. The peculiar feature was the intestinal coils were of the same shade of color. A rapid exploration was made of the appendix, hernial rings, and of the pelvic organs. Nothing abnormal was found. After that the region of the gall-bladder was explored and numerous adhesions were discovered. Realizing that we had some unusual condition to deal with, the incision was extended upward for 3 inches. The distended intestines were permitted to escape out of the abdomen, and protected by moist, warm towels. Up to this stage of the operation, no cause for the obstruction had been detected. We now found that all of the small intestine, from the head of the colon up to near the jejunum, had rotated upon the mesentery, making almost one complete turn; the head of the colon was pulled up and drawn across the middle line, making the constriction more complete. By grasping the whole mass of distended bowels, which had previously been enveloped by the moist towels, elevating and turning them toward the patient's right, the volvulus was easily corrected. During this manipulation the cause of the obstruction and volvulus was discovered. A large gall-stone was lodged in the small intestine about 18 inches from the colon. It was observed that, immediately after the intestinal mass was rotated, the discoloration of the bowel was greatly lessened. It was thought it would be an easy matter to push the stone on into the colon, where it would be quite harmless. But after it was pushed only a short distance, it became lodged and we found that it was quite impossible to push it farther, without using undue force and consuming too much time. Clamping the bowel upon either side of the stone, it was incised opposite the mesentery and the stone removed. The bowel was then repaired in the usual manner. As soon as the clamps were removed, the gas and liquid contents passed freely into the colon. Before the abdomen could be closed a large evacuation from the bowels occurred. The operation did not consume much time. From the commencement of the administration of ether, until the dressings were placed, less than twenty minutes were occupied. Great shock followed the operation. Notwithstanding our best efforts at stimulation, such as dry heat, normal salt transfusion, adrenalin and strychnia, the patient succumbed in two hours, without regaining consciousness.

There are several interesting facts to be noted in the study of this

case. From the clinical history, it is more than probable that the stone passed into the intestine shortly after the oil was administered on January 1. Because the stone did not completely block the lumen of the bowel, so as to wholly obstruct the passage of gas, well-defined symptoms of obstruction were not present during the first five days of her last illness. That the stone was gradually pushed through the intestine, aided by the various cathartics administered, as well as by the violent peristalsis, is a reasonable supposition. There were no alarming symptoms until the stone became obstructed in its passage on the morning of January 6, at which time all of the symptoms were suddenly aggravated. The patient complained of severe pain and for a short time, the most violent peristalsis prevailed. It is quite certain that the volvulus developed at that juncture; the peristalsis ceased then, and did not manifest itself thereafter. Nature's heroic effort, the violent peristalsis necessary to push forward the obstructing body, was the real cause of the fatal complication.

Again, the case is a forcible reminder that gall-stones may remain comparatively quiescent for years and be the direct cause of death in different ways. One of the causes of death from neglected gall-stones is cancer in and about the biliary ducts. I was the first to call the attention of the profession to this now well-established clinical fact, in a paper read at the American Association of Obstetricians and Gynecologists, at St. Louis, Mo., September 20, 1892, vol. v, of the *Transactions*. Infection from gall-stones, with all of its attending evils and complications, is a familiar picture to us all. The slow process of ulceration, necessary for the passage of a large stone into the bowel, is a source of very great danger to the patient, and one that would require a great deal of time to discuss; therefore, I will not consider in now. That any of these cases survive all the dangers attending this tedious process of ulceration is a striking illustration of the marvelous resources of nature.

Usually the real cause of the disease is not recognized until the stone is discharged with the stool, or revealed during an operation or autopsy. The history of a gall-stone colic of months or years ago is ignored or has been forgotten. With these facts before us, and similar cases constantly coming under observation, would it not be the part of wisdom to advise an early exploratory operation before obstruction occurs? Especially would I urge an exploratory operation in all of the cases in which there exists a distinct history of one or more acute attacks of pain referable to the bile passages. These patients are now being treated by many physicians, con-

tentedly and hopefully upon their part, with very indefinite results. The condition is variously described by such vague terms as "stomach symptoms," "discomfort after meals," "indigestion," "neuralgia," "gastralgia," "liver derangement," etc., and is treated for years by physicians, as we view it, who wait for "something to happen." If I can stimulate the general practitioners and specialists in this line to employ more advanced methods of treatment for this class of patients, I shall feel more than repaid for my efforts in presenting this case to you.

628 ELM STREET.

DISCUSSION.

DR. HUGO O. PANTZER, Indianapolis, Indiana.—The very thoughtful and vivid presentation of this case brings to my mind one case which to me was very instructive. The case was reported by Dr. Elsner of Rochester, N. Y., about twenty odd years ago under the striking title "The Vagaries of a Gall-Stone." In that case a stone of similar size to that described by Dr. Hall, following a history of long-standing gall-bladder trouble was attended by attacks of acute obstruction. When finally a large stone was passed by the rectum, the riddle was easily explained. The stone in its course down the intestine would create local irritation, and within the adjacent musculature would develop spastic contraction causing temporary obstruction of the bowels at that site. Under the influence of time and medication the spasm relaxed and then the stone went farther down, again to be caught up, until finally its rectal expulsion gave relief. It occurs to me that Dr. Hall's case is unusually interesting inasmuch as it was complicated with volvulus. I believe it is about the only case of the kind ever reported. Whether this case in January had the volvulus is to me questionable in the light of Dr. Elsner's case and one similar case I had. I would rather incline to think that the cause of obstruction was somewhere higher up in the small intestine, and that it was not attended with volvulus until the stone had traversed the full length of the small intestine and approached the ileocecal valve, and that then the volvulus occurred coincidentally. My similar case was one of intussusception owing to intraileal fibroid tumor, which was reported to this meeting two years ago.

DR. HALL.—Let me correct an impression you have. I tried to make the point that the volvulus occurred on the morning of the day of the operation, that is, five days after her illness. If Nature had not produced this great peristalsis the intestine probably would have been relieved in a few hours by pushing the stone on into the colon.

DR. PANTZER (resuming).—I am glad to stand corrected. In my case the intussusception had existed for several days. The intussusception was a natural issue caused by the fibroid attached to the inner wall of the intestine.

DR. FRANK D. GRAY, Jersey City, New Jersey.—This is a very

practical paper in which the author reports a very interesting and instructive case. There is one thing all of us every now and then learn from our own experience and observation of others, and then quite frequently we forget it over a long space of time, and that is the matter of dealing with these abdominal conditions, whatever they may be, promptly. We have pretty well learned that lesson as regards appendicitis. We are trying to learn it with reference to the malignant conditions in the abdomen, but when we come to the chronic abdomen we so often forget that it is just about as important to find out by actual exploratory operation what the trouble is as it is in the acute abdomen. If this particular case had been operated on promptly, there is no doubt that the woman's life would have been saved, and I think that the chief lesson of this paper is to pay attention, to give heed to the undoubted and persistent symptoms, go in and find the trouble and relieve it.

DR. FRANCIS REDER, St. Louis, Missouri.—This case is of interest from two points of view. In the first place, what a gall-stone can do, and, in the second place, the promptness with which this patient died two hours after the operation without regaining consciousness. An interesting feature is the cause of death, which the essayist attributes to the violent peristalsis. There are other factors to be considered. The principal one, I venture to say, is that of anesthesia. With all due respect to the essayist, I presume it was a general anesthetic. The resisting power of this patient had undoubtedly been underestimated. This was a case for local anesthesia and for exploratory operation. We must here accept as a contributory cause of death a toxemia excited by bacteria of the intestinal tract before the operation plus a flooding of the intestinal tract after the operation by large quantities of the stagnant contents with their poisonous products.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—If 30 per cent. is our accurate diagnostic average in the abdomen, then operation should be done promptly, and more on suspicion than on diagnosis, more on opinion that something is wrong than waiting until we feel that something is positively and surgically bad. In Europe or in Mexico or in the abdomen, watchful waiting is bad policy. In going over my cases and studying them very carefully I find that death in many of them was due to dilatation of the right side of the heart, which comes on quickly after an abdominal operation, partly due to the anesthetic, and partly due to the condition of the heart. The fact that the abdomen was relieved makes me feel that possibly in this case we had a right-sided heart failure.

DR. J. HENRY CARSTENS, Detroit, Michigan.—When you do an operation in twenty minutes, that certainly is the best anyone can do. I agree with what the essayist has said and with what Dr. Gray has said, that we do not do these operations early enough. If we can make a provisional diagnosis and do an exploratory operation, we will never have many of these cases go to the bad.

DR. MAGNUS A. TATE, Cincinnati, Ohio.—The case history Dr. Hall presented reminds me of one I saw about five years ago. A

woman, about sixty years of age, had been complaining for a number of years of pain and tenderness over the gall-bladder region. One day she was taken with severe vomiting, abdomen became distended, and I tried my best to persuade her that a section was necessary. She refused to undergo an operation. A day or two later I was called to the country to operate, and while there this patient became critically ill and passed into a state of collapse. My friend, Dr. Horace Whitacre was called to see her and he hurriedly took her to hospital and operated. He found a large stone, $2\frac{1}{2}$ inches in length and about 1 inch in thickness in the intestine some 6 inches below the gall bladder. The intestine was gangrenous and ready to burst. In making the resection a portion of the contents escaped into the abdominal cavity. The patient died about three hours after operation. This is the only case of this kind I have ever encountered in my practice and I intended at some time to make a full report of it, but the one presented by Dr. Hall was so similar in many respects to mine that I thought I would put mine with his on record.

DR. JOHN F. ERDMANN, New York City.—One can sympathize with Dr. Hall in reference to the matter of mortality. Personally, I have had five cases of intestinal obstruction from gall-stones in the past ten years, and of this number four of the patients died. Strange to say, the recovery was in a woman, seventy-two years of age, upon whom I did an enterostomy and appendectomy. She also had a large tumor of the right ovary, which was also removed. One of the patients had a very large stone which was fully the size of a small goose egg, this patient died within six days from the time of the operation from septic peritonitis. Three of the male patients had stercoraceous or fecal vomiting. The trouble we have to contend with in connection with these cases is delay on part of the patients themselves and failure to recognize the symptoms. In other words, the three male patients whom I operated suspected that nothing was the matter with them with the exception that they were constipated, when I saw them in consultation they were having fecal vomiting and were practically moribund.

DR. HERMAN E. HAYD, Buffalo, New York.—Dr. Erdmann has brought out a very important point in reference to these cases of gall-stones. I recall a patient, a woman seventy-nine years of age, who had practically no symptoms. So far as the passage of the stone is concerned, she never had an attack of violent pain, and yet the stone was as large as a small hen's egg. I was called to see her when she was having stercoraceous vomiting. She continued to vomit for two days, would not let me operate at that time, but finally I persuaded her to be operated on, she gave her consent, and died of pulmonary edema two days after the operation. These cases in old women either show how patulous or dilatable the ducts become, so that the stone passes through or do they always ulcerate through. There was no history of ulceration, such as pain, nor of an inflammatory attack. The stone was found in the bowel and the symptoms were those of intestinal obstruction.

DR. ALBERT VANDER VEER, Albany, New York.—There are two or three points brought out in connection with this subject that are

exceedingly interesting and impressive. In my collection I have a specimen which I secured many years ago that impresses me very much now as it did at that time. A patient, whom I had attended some fifteen years previously—one of my first cases, in a rather prominent citizen—was taken very ill with an acute attack of jaundice, due, as we believed, to an obstruction of the common duct, by the passage of a gall-stone. He recovered from this illness and lived many years afterward in good health. At the time of his death I was permitted to hold an autopsy, finding a direct communication between the neck of the gall-bladder and the beginning of the transverse colon, due to ulceration, the formation of adhesions and a fistulous tract leading to the large intestine. I believe this man, in his previous illness had passed through a stage whereby the gall-bladder was relieved of gall-stones, and they had passed out to the large intestine.

At about this time I was called to see another patient, who was suffering from very much the same symptoms. She was the wife of one of our leading masters in dancing; she did a great deal of dancing and believed this form of exercise contributed to her attacks of biliary colic. Her last attack was very much like the case to which I referred. Years afterward she passed what we called a gall-stone, brought it to me, and I still retain it in my collection. It was nearly the size of the one Dr. Hall has spoken of. I cannot believe it passed from the gall-bladder into the intestine that size, but belonged to a class we call enteroliths, with a small gall-stone as a nucleus.

Dr. Hall reports this as a gall-stone. Two or three other cases have been reported here as gall-stones. I have always used this as an argument with patients: You suffered one, two, possibly five years ago from an attack of what was supposed to be gall-stone colic; you may have passed a gall-stone into the intestinal tract; you are now suffering from symptoms that make us believe you have some obstruction of the intestinal tract due to the original gall-stone which has now become a large mass. I believe these are true enteroliths. These are not passed into the intestinal tract when they are of that size. They must enlarge somewhat; some additional concretion may take place, and we can use this as an argument: that not only do gall-stones produce malignant disease, but if they are allowed to remain in the intestinal tract they are largely an element of obstruction, and patients ought to submit to an operation. I have seen cases where we had reason to believe the former trouble was now leading to more serious disturbances.

Dr. Hall has brought out an excellent point in regard to the mortality. Any form of obstruction, whatever it may be, may produce this condition of volvulus. Any condition that will produce a tendency toward a portion of the intestine to twist upon itself, so that the mesenteric veins are involved, will bring about a condition of shock from which we must expect a large mortality. These patients do not rally well from operation afterward; many of them die in the acute condition.

Dr. Erdmann has given us a report of several cases with the fatalities. I wonder to-day how many cases we are getting in which the

intestinal obstruction is due to gall-stones passing into the intestinal tract and there producing a form of obstruction.

There is one point Dr. Hall did not bring out, and that is these large enteroliths will permit the escape of gas and liquids. They are proper cases for exploration without doubt. We do not see as many cases as we did thirty years ago because people are now willing to undergo operations at once for the relief of gall-stones. Dr. Hall has been one of the pioneers in that direction and we are indebted to him for reporting these cases and making use of them to impress upon patients who have gall stone colic the necessity of operation and the great danger to which they are exposed in allowing a condition of this kind to go on.

DR. CHARLES L. ILL, Newark, New Jersey.—Some thirty years ago I saw my brother do a postmortem on a patient who died from an obstruction of the bowels. In this case we found a mass between the small intestine and the gall-bladder. Three large gall-stones passed through the ulceration into the intestine, caused obstruction, and killed the patient.

In a second case, a woman who had an obstruction of the bowel, and we were not able to get a history of gall stone at the time. She had a large stone in the ilium near the ileocecal valve. It gave her a complete obstruction. She was in bad shape. The appendix was adherent near the seat of obstruction. I loosened up the adhesions, pushed the stone into the large intestine, sewed up the patient and she got well. She passed a stone two or three days later. In a third case, where we were scarcely able to make a diagnosis from the history, the woman was suffering from symptoms of obstruction. I operated, opened the intestine and took out a large stone. This patient recovered. I do not quite understand how we are going to make an early diagnosis in these cases for the reason that they come to us in the last stages. If we had these cases earlier or had them under observation in the hospital a diagnosis would be more likely.

DR. D. TOD GILLIAM, Columbus, Ohio.—Gall-stone obstruction of the intestinal canal usually occurs at some point well down toward the ileocecal valve. This because the lumen of the gut gradually diminishes from above downward and the stone eventually finds a place where it cannot pass through. If it should be able to pass the ileocecal valve it finds easy passage through the colon and escape unobserved. Obstruction in the region of the ileocecal valve will give rise to great abdominal distention. As one of the most frequent causes of obstruction in this vicinity aside from ileus is the enterolith or gall stone it follows that intestinal obstruction with great abdominal distention, especially in old people should always suggest the presence of gall-stone or enterolith.

DR. JOHN NORVAL BELL, Detroit, Michigan.—Dr. Hayd asked the question, how do these large stones manage to get into the bowels. The case I had will perhaps elucidate that in a measure. A woman, sixty-seven years of age, who had never had any pain, but simply heaviness and fullness, had a palpable tumor of good size, but it was

hard to determine the nature of it. On opening the abdomen, I found it was a large thickened gall-bladder full of stones. There was one stone four times the size of the one Dr. Hall has described. Between the gall-bladder and the colon were several cribriform openings, some large enough to insert the little finger, showing how nature was endeavoring to ulcerate that adherent wall to make an opening and force the stone into the bowel.

DR. WILLIAM EDGAR DARNALL, Atlantic City, New Jersey.—The question arises: What is the character of these stones? I was talking to my friend Dr. Hayd about a woman from California who underwent an operation. In this case the surgeon inserted his finger into the rectum and pulled out a gall-stone that was very large, too large to be contained in any gall-bladder.

How much of these obstructive gall-stones is actually gall-stone, and how much is due to enterolith accumulation?

I recall a case I saw a year or two ago on which I operated. The diagnosis was appendicitis with all of its symptoms, but when we got inside we found a little puddle of pus and fished out a stone about the size of a goose egg. The shell was one-eighth of an inch thick, and composed of hard calcium salts. That enterolith, which it was undoubtedly, contained several accumulations of bile salts.

What is the composition of these large stones?

I recall another case I had a few years ago in which there was a stone the shape of the gall-bladder which filled up the whole gall-bladder. This stone was made up entirely of calcium salts, except at one end of the stone there was a small accretion of bile salts, the balance of the stone was crystalline and made up of calcium salts, very hard, as hard as a rock. I do not recall ever having seen such a stone except in that one case, and I should like to know the experience of the fellows as to the percentage of calcium stones found in the gall-bladder.

DR. HALL (closing).—I have been very much gratified that my paper has elicited such a free discussion, and from the discussion we have had I want to say that I do not feel at all inclined to apologize on account of the death of my patient. We, as surgeons, take cases of intestinal obstruction as we get them and not as we would like to have them, and if a patient is not dying, it is our duty, not always our pleasure, to give that patient the last chance of his or her life. This patient would not have recovered under local anesthesia or any other form of anesthetic. In fact, she was very much better while she was on the operating table than at any time before or any time after. She had gas-ether anesthesia. She had a few whiffs of gas and then ether. Her pulse was much better, and her general condition much better while she was under the influence of the anesthetic. It stimulated her. That is my experience with ether. It stimulates these patients in a short operation like that. When I put the patient under the influence of the anesthetic I thought, that I would for the time being open the intestine and do a secondary operation a few days later, but there was no place to stop at. I hoped to make a short operation simply draining the intestine. A vast

number of these cases come to us after having gone the rounds of doctors and have been treated for stomach trouble, dyspepsia and so on. I have for many years made a question-mark after my diagnosis of gall-stones, urging an exploratory operation. It usually ends by removing the gall-stones or the gall-bladder, sometimes doing a gastroenterostomy. But usually it is a gall-stone or gall-stones back of the symptoms and the diagnosis can generally be made. The average patient will now undergo an operation when you tell her she has gall-stones. They are ever ready to take your advice to resort to an exploratory operation. There are plenty of such patients that ought to be operated on.

This process of emptying the stones into the intestine is a very slow one. It is an ulcerative process. These stones find their way through into the intestine by ulceration. This stone fitted the contracted gall-bladder. The stone is formed by many small stones, the various stones are glued together. This stone is not an enterolith but a true gall-stone and it ulcerated its way through into the small intestine. I have operated several times and found a stone almost through the gall-bladder on its way to the intestine.

Away back in 1888 I was asked to see a prominent physician about my own age. He had been sick a long time. He had an enormous mass in the region of the gall-bladder. I urged an operation. I was pushed out of the case immediately and was not allowed to come back. He did not want to undergo an operation. He convalesced slowly. He went to Florida, and the stone passed into the intestine and he brought it back for me to see. He made a beautiful temporary recovery. This patient was one of the best known practitioners in Cincinnati; he practised medicine for years afterward, and ten years ago he began to complain of stomach symptoms. He would not be operated; for many weeks there was little food passing out of his stomach and finally he died, a year or two ago. He would not undergo a gastroenterostomy nor would he have any kind of an operation. There was agglutination of the stomach and intestines in the region of the gall-bladder where the stone had ulcerated through. The history was typical. We all see such cases. When a stone goes through in that way and the patient lives, that patient does not get well, he or she may improve for a while, but they have trouble subsequently.

CHOLECYSTECTOMY VERSUS CHOLECYSTOSTOMY.*

BY

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INNUMERABLE controversies have been waged over the comparative merits of cholecystectomy and cholecystostomy in the treatment of gall-bladder disease. It is not my intention to review the history of these differences of opinion nor to tabulate the arguments that have been advanced by the opponents and the exponents of each operation. Any up-to-date text-book supplies this want with sufficient accuracy and fullness. I shall present for discussion simply a brief outline of the operative work I have done and its results. Wherever there might be room for a difference of opinion on the treatment adopted, I shall give a short *outline* of the reasons which influence me in the selection of the particular operation chosen.

In considering any form of surgical intervention two points must always be borne in mind; first, the primary and secondary mortality; second, the subsequent health of the patient. It is little satisfaction to the surgeon and his patient if, because of the latter's death, a permanent cure of his illness is not obtained. On the other hand, there is not much more room for glory if a patient recovers from a surgical operation only to realize that he still suffers, and continues to suffer, as before. In other words, the operation, undertaken for his cure, was ineffectual and the postoperative state of the patient is worse than ever; or, if not worse, it is no better. From the patient's standpoint the operation has been a complete failure.

For the simple reason that primary and secondary results are better, removal of stones from the biliary ducts before infection has occurred to alter these passages and to cause upper abdominal distortion by the formation of adhesions, is one of the simplest, safest and most satisfactory operations known to surgery. But it is an operation which the surgeon has all too few chances to perform. Practically, every operator would content himself with simple drainage in such a case.

Unfortunately our gall-bladder cases are seldom so simple. They usually present themselves for operation with symptoms dating back months or years. The pathological condition has spread to the

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surrounding viscera by various routes of communication. In such cases one has to select the operation which not only relieves the original focus of disease, but which takes into consideration the surrounding pathological conditions and the possible subsequent developments, and which will leave the neighboring organs in a condition best calculated to enable them to regain their normal functions. It is in these cases then that we must consider the relative merits of cholecystectomy and cholecystostomy.

The results here presented are based on all the operations I have performed in the upper abdomen where there was, primarily or secondarily, any implication of the gall-bladder and bile ducts. I have performed 2600 such operations. In common with most operators of experience, my mortality has been due in nearly every case to the complications attending the original disease. Everyone realizes what an important bearing on prognosis the presence or absence of adhesions, hepatic or common duct disease, involvement of the pancreas, etc., have.

No absolute rule can be laid down to guide the operator in determining when cholecystectomy is preferable to cholecystostomy; yet there should be some way of ascertaining why there is so much higher percentage of cures after removal of the gall-bladder than after drainage. From the former cases, in the patients who survived operation and answered our inquiries, we get a report of 96.8 per cent. of cures; the remainder suffered from symptoms probably indicative of associated gastric or pancreatic disease. On the latter cases, in cholecystostomy, there were only 74.8 per cent. of cures, the remainder being no better, and many of them worse, than before operation. In considering the latter cases it is, of course, true that in many of them the disease was so advanced and adhesions so extensive that removal of the gall-bladder was out of the question because of its higher mortality of cholecystectomy under conditions like this. There are still a large number of cases where it seems to be reasonable to suppose that better permanent results might have been obtained by removal of the gall-bladder than by simple drainage. This argument receives verification from the results obtained in the two-stage operation where, for some reason, we decided to drain the gall-bladder in the first operation and then remove it in a secondary operation four to eight weeks later.

The question is how to decide definitely between these two operations. It is, too, a question of mortality, which is slightly higher in cholecystectomy than in cholecystostomy, 2.3 per cent. as compared to 2.5 per cent. In the former the mortality is kept down by

choosing the drainage operation wherever conditions indicate increased risk from removal of the gall-bladder. The dangers of cholecystectomy include the possibility of injuring the ducts, vessels and surrounding viscera from the manipulations necessary to free the adhesions.

Another argument urged against cholecystectomy, is the removal of the most valuable landmark should subsequent operation on the ducts become necessary in consequence of obstruction due to stricture or stone. While this is true in certain instances, it also furnishes an argument in favor of early and complete operation when removal of the diseased area will preclude the possibility of these sequelæ. An early and radical operation is the best argument against this eventuality; and this more than anything else, guides me in choosing the operation best suited for the individual case. Cases where the disease, while confined to the gall-bladder still, has shown, or is showing, a tendency to invade the surrounding organs are, I believe, the cases for primary cholecystectomy. This operation offers the best chance for a permanent cure.

When adhesions are so extensive that the removal of the gall-bladder would be attended with marked traumatism and leave large areas of raw surfaces to be covered, then, because of the high primary mortality and the little hope that subsequent complications will not arise, I believe better results are obtained by drainage of the gall-bladder. While I believe that a diseased gall-bladder, like a diseased appendix, should always be removed when possible, I recognize the fact that there are exceptions. One exception I have already mentioned; another is when the common duct is full of stones. In these instances I drain through the cystic duct or gall-bladder and close the opening in the common duct.

This leaves for discussion those cases where acute infection is present, and those in which there is marked jaundice from obstruction. In the latter the simplest operation, one consistent with re-establishing the flow of bile through the common duct, is the one of choice. Removal of adhesions and diseased areas should be dispensed with. Every step in the operation should be made subservient to the one purpose: Overcoming the obstruction. After the re-establishment of the biliary circulation and the recovery of the patient from the jaundice, the subsequent course should be determined by the symptoms. Whatever the symptoms may be, the condition of the patient will be so improved that any subsequent operation carries, proportionately, much less risk. The drainage instituted at the first operation will have caused great improvement

in the field of operation and justifies the expectation of a permanent cure from the second surgical intervention.

I have already referred to the two-stage operation; its field of usefulness is most marked in acute infection of the gall-bladder or upper abdomen. Because primary removal of the gall-bladder opens up so many tracts for the possible extension of infection, and because experience has shown that, occasionally, a patient does die from acute sepsis in infections of this kind, I am convinced that, in presence of this condition, the gall-bladder should be drained with as little manipulation as possible. Then, at the end of four to eight weeks, even if recovery is apparently complete, the gall-bladder should be removed. These are the patients that are left with a chronic infection which advances so insidiously that years may elapse before there is a return of the symptoms; but when they do return the involvement of structures in the upper abdomen is, frequently, too extensive to permit complete removal of the gall-bladder and to secure an ultimate cure. In these cases the diseased areas also offer favorable fields for subsequent development of malignant degeneration.

In advocating cholecystostomy in infection cases I do not mean to include hydrops and chronic empyema of the gall-bladder in a quiescent state. Cholecystectomy is safe procedure where the infection has ceased to be active.

I wish to refer to one other type of case where, I firmly believe, cholecystectomy offers the only hope of permanent cure. I mean those cases in which the bile is thickened and inspissated and, usually, unassociated with the presence of stones. This condition indicates disease of the gall-bladder, and there is every reason to believe that a diseased gall-bladder is never regenerated and so, like a diseased appendix, should always be removed when its removal is not associated with too much danger to the patient.

In these days, because of the frequent involvement of the pancreas in diseases of the gall-bladder and bile ducts, prolonged and even permanent drainage of the biliary system is often advocated. Because of the popular tendency to pay so much attention to prolonged drainage, another equally important point is overlooked. I refer to the exhausting effects and dangers occasionally observed in abdominal drainage. In the literature little, if any, mention has been made of the deleterious effects of *too prolonged abdominal drainage*. While this point is, undoubtedly, well understood by operators of experience, it seems to me it should receive more attention. My own practice is to remove drainage early in any patient slow to react from an abdominal operation. I never leave gauze in the abdomen longer than

twenty-four hours. When the pancreas is involved, I drain the common duct with a rubber tube which is never left longer than six or seven days. When possible, instead of draining through the common duct, I drain through the gall-bladder or cystic duct and close the opening in the common duct. I believe this is long enough to drain for pancreatitis when drainage offers any hope of cure, and it minimises the possibility of fistula formation which is so exhausting to the patient, occasionally even causing death.

1105 PARK BUILDING.

DISCUSSION.

DR. JOHN F. ERDMANN, New York City.—Last year I presented to the meeting of the Association at Buffalo three hundred and some odd cases of gall-bladder operations, with a mortality rate that to me was rather pleasing. I am speaking of the mortality rate in association with the mortality rate presented by the author of this paper. In my last series of cholecystectomy there was a mortality of about $\frac{1}{4}$ per cent. less than in cholecystostomy. In the main I agree with what Dr. Swope has said.

As to the question of cholecystectomy *versus* cholecystostomy, let me say that in these days of activity, efficiency and morbidity are the things all of us should consider beside reducing the mortality to the lowest point.

Recalling the paper of Dr. Moots last year, one cannot but feel that any operation which will lessen the morbidity is the operation *per se*. Anything that will increase efficiency must of necessity decrease morbidity. Cholecystectomy without any question limits morbidity and increases efficiency. In other words, when cholecystectomy is performed the patient is out of bed in from ten days to three weeks, and ready to go to work in three to five or six weeks later. When cholecystostomy is done he is not out of bed in that time, but wears a drainage tube or has a leakage from three weeks to months depending upon his condition. The morbidity of cholecystostomy is then protracted in direct relation to the convalescence. There remains frequent secondary trouble in the gall-bladder which will call for drainage, or the patient may escape from your observation and you cannot do a secondary operation. Such a patient has a lingering convalescence or prolonged morbidity. Even then he is not well. He comes back to you with a belly ache or complains of gas pains or he has an atrophied gall-bladder or adhesions or cholecystitis. A stone may be left in his cystic duct and he has got to go through the same trouble again and he is limited as to efficiency to a profound degree.

As a result of my statistics last year I have been doing cholecystectomy practically in every instance. Of course, there are cases in which we must do cholecystostomy and not cholecystectomy. Why do I do cholecystectomy now more frequently than I formerly

did? Because I find my mortality is less with increasing efficiency and decreasing morbidity, so that it is now an operation of choice.

Only two weeks ago I opened the abdomen of a patient and found a double perforation of the gall-bladder. It looked suspicious. I sent the specimen to the pathologist and his report stated it was an inflammatory condition only. I requested him to make a second examination. He did so and reported apologetically adenocarcinoma.

In regard to the landmark of the duct, some ten years ago I was unfortunate in being one of the earliest men to advocate cholecystostomy *versus* cholecystectomy, owing to the fact that we might lose the anatomical landmark of the duct. I do not believe that nowadays.

As to the two-stage operation I do not believe I have done it more than twice in seventy-five or one hundred cases. I take the gall-bladder out, leave in gauze drainage for the first forty-eight hours to four or five days, depending on the intensity of the infection.

In regard to prolonged or acute drainage of bile as I prefer to call it, Dr. Gordon Hayd, my assistant and myself have seen in the post-graduate school three successive cases in a state of profound collapse at the end of forty-eight hours as the result of absolutely acute drainage of bile. There is in these cases a rapid loss of lime salts and of fluids in the system. In these cases, wherever prolonged drainage is needed we are prone to pinch off the tube if it is in the common duct or in the gall-bladder after the first forty-eight hours. In other words, we pinch off the tube two hours at a time, so that the patient gets some lime salts and bile back into the system and then we give also to the patient ox-gall.

DR. C. S. FOSTER, Pittsburgh, Pa.—In many cases of cholecystostomy and cholecystectomy the indications are absolute, such as the big gall-bladder or diseased gall-bladder, as referred to by Dr. Swope. Sometimes we go into the abdomen and find a normal appearing blue gall-bladder that we should take out. How do we know it should be taken out? These cases are often drained and we have a recurrence of the symptoms. In these cases also we find the strawberry gall-bladder, so to speak, or the papillomatous gall-bladder that Dr. Erdmann spoke of. There is an indication for taking these gall-bladders out that up to the present are not producing symptoms. For instance, if we inspect the ducts and the ampulla of the gall-bladder and find the glands enlarged along the ducts, independent of pancreatic disease or of involvement of the duodenum or the stomach, we know that such a gall-bladder is infected and that gall-bladder ought to be taken out. Infection travels through the portal circulation of the liver, and no matter if we drain the gall-bladders that are apparently healthy with a blue-colored serosa, we have a recurrence of the symptoms. These cases are generally known as the papillomatous gall-bladders, or the strawberry gall-bladders, and the indication is when we find enlargement of the glands along the duct, the gall-bladder should be extirpated.

DR. JOHN W. KEEFE, Providence, Rhode Island.—When a man

comes before us and reports 2600 operations on gall-bladders, we have to sit up and listen, and no doubt his experience leads him to do the operation in a definite way. He also comes to the conclusion that in a certain proportion of cases he will remove the gall-bladder. I firmly believe that men like my friends Drs. Swope and Erdmann, who say that they are removing more gall-bladders to-day than formerly, are more expert in doing that operation than most of us; but I believe that many surgeons, from reading this paper, would come to the conclusion that now we must remove practically all gall-bladders. Those men who are taking out all gall-bladders I believe are going to do a great deal of harm, because the general profession does not understand that these men are particularly skilful in taking out these gall-bladders. I firmly believe we ought not to operate during the acute stage of inflammation in gall-bladder disease. Occasionally, we will have a perforation and have gangrene, yet there will be a few cases in which it is necessary to operate during that period; but if one could refrain from operating on the acute cases and wait until convalescence is established, he would meet with greater success when he does come to operate. It comes down to the personal equation as to whether one should remove the gall-bladder or drain. There is no question in my mind but that the general mass of surgeons, will do better by doing a cholecystostomy in most instances, rather than a cholecystectomy. There are some cases where the average man may remove the gall-bladder at the primary operation successfully. If you do not get a result from the primary operation of cholecystostomy we still have the operation of removing the gall-bladder. At one time it was thought that if we drained we might have considerable difficulty in removing the gall-bladder subsequently. Now, we know that is not so: that any good surgeon has no difficulty in removing the gall-bladder at the secondary operation.

With reference to the question of morbidity, that is one thing to be avoided by us all, but do not surgeons have morbidity following cholecystectomy? We all know that at times stones are formed in the hepatic ducts and not in the gall-bladder alone. In some of these cases where we have to remove the gall-bladder and drain the common duct, we find a permanent fistula. What are you going to do with these people that are walking about with permanent biliary fistulae?

DR. FRANCIS REDER, St. Louis, Missouri.—Dr. Erdmann has brought out a very important point in regard to feeding with ox-gall the patient who is deprived of bile salts.

If you are reasonably certain that the patient's bile is in a normal condition you can feed that patient with his own bile. It is necessary, however, to introduce it into the stomach with a stomach-tube, otherwise the patient will reject it.

DR. SWOPE (closing the discussion).—In regard to the removal of the gall-bladder, I have never had a fistula follow its removal, and I have taken out a great many gall-bladders. The removal of the

gall-bladder is to me a very satisfactory operation, and if there is no jaundice, I take these gall-bladders out almost always, regardless of how high the inflammation is. It is very much like a diseased appendix, when the abdomen is opened they are removed. I have not left a diseased or suppurating appendix in for five years, and my results have been good. The same thing is true of the gall-bladder. I believe that these gall-bladders when infected and diseased ought to come out, and I do not hesitate to take them out, and my patients leave the hospital in two and a half weeks and are well. When I drain these gall-bladders they are never well. I have 98 per cent. cures from cholecystectomy, and 74 per cent. only from cholecystostomy. I have heard from 1900 patients during the last fifteen years and that was the record got from them. So to-day, after so many recoveries, I would not do anything else but a cholecystectomy.

UNUSUAL CONTENTS OF INGUINAL HERNIÆ, WITH REPORT OF A CASE.*

BY

CHARLES W. MOOTS, M. D., F. A. C. S.,

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It has been no small task to review the literature upon this one form of hernia, and I fear the project would have been early abandoned had not our friend and fellow-associate, Furniss, so enthusiastically come to our aid.

The difficulty has not arisen from a lack of historical material, but rather from one of judgment in selecting from voluminous works those cases that I felt might be of interest to the Fellows of this Society. Trusting that this review may not be unprofitable, I beg to submit the following:

Morton, John, 1909. *Case of a foreign body in the sac of a hernia, with remarks on the presence of foreign bodies in the abdominal cavity.* *Glasgow M. J.*, vol. lxxii, pp. 52-56.

Irreducible inguinal left hernia in male, aged forty-two. At the operation it was noted that the coverings were very well developed and the sac of the hernia very thick. On incising the sac a large quantity of dark serous fluid escaped. The contents were found to consist of a large piece of omentum, very extensively adherent to the fundus, and along the whole posterior wall of the sac up to and beyond the neck. While examining the adherent omentum, finger came upon a sharp body, which proved to be a fish rib, an inch and a half in length, retaining its normal curve, and being quite hard and of a yellow translucent appearance. Thinks that the acute symptoms which the patient had three weeks prior

* Read before the Twenty-eighth Annual Meeting of the American Association of Obstetricians and Gynecologists at Pittsburgh, Pa., September, 1915.

to operation, coincided with the entrance of the foreign body into the previously formed sac, causing the pain and setting up more or less acute inflammatory symptoms. Thinks that the bone must have been swallowed, and then found its way into the general peritoneal cavity by perforation of stomach or intestine.

Mumby, L. P., 1896. *Inguinal hernia involving the ovary*. *Brit. M. J.*, Lond., vol. i, Jan. 4, p. 17.

Child, aged four years, had ovoid swelling in right groin extending well into labium. It was due to a hernia of the intestine, together with a hernia of the ovary. Intestine was reducible, but ovary not so. Incision and dissection out of sac. Some torsion of the pedicle present, preventing its reduction until ring had been enlarged by the knife. Recovery.

Brebner, James W., 1910. *A case of enormous inguinal hernia*. *Transvaal M. J.*, Johannesburg, vol. vi, pp. 11-12.

Double inguinal hernia in male, Hebrew, aged forty-eight. Left inguinal hernia contained portion of cecum, with appendix, and about 3 feet of small intestine. Right inguinal hernia sac contained a large mass of omentum loaded with fat and adherent to the lining membrane. Both sides operated on. Recovery with good results.

Bonney, Charles W., 1909. *A text-book of genitourinary diseases including functional sexual disorders in man*. By L. Casper, 2d. ed., Phila., p. 286.

"Hernia of the bladder may occur in any part of the lower abdomen where other herniæ take place, but its most common location is in the inguinal canal. Even this form, however, is rare. The bladder is either adherent to other structures, with which it has escaped into the inguinal canal, or else fatty tumors pull it in; congenital abnormalities, such as increased length of the superior suspensory ligament or of the ureters, diverticula, relaxation of the bladder, etc., may also be responsible for the occurrence of this condition."

Andrews, Frank T., 1905. *Hernia of the tube without the ovary*. *Jour. Am. M. Ass.*, Chicago, vol. xlv, pp. 1625-1629.

Collected 362 cases of hernia of the female pelvic organs and added four observations of his own and friends.

Hernia of tube without ovary.....	46
Hernia of ovary and tube.....	80
Hernia of ovary without tube (or tube not mentioned).....	167
Hernia of nonpregnant uterus.....	43
Hernia of pregnant uterus.....	30
Total.....	366

Early in the second century, Soranus of Ephesus described the first case of hernia of the ovary. No further observation was made

until 1716, when Louis Leger de Gouey of Rouen wrote an article citing a case of intrahernial tubal pregnancy.

In 1901 Dr. Paul F. Morf (*Ann. Surg.*) published a very complete work on the subject.

Andrews, Frank T., 1906. *Hernia of the ovary and tube. J. Am. Med. Ass.*, Chicago, vol. xlvii, pp. 1707-1713.

Reviews the literature on hernia of the ovary and tube and analyzes cases of inguinal hernia as follows:

Right.....	31	Found at autopsy.....	7
Left	44	Not stated.....	1
Double	8	Operated on.....	80
Not stated	5		
	<hr/>		<hr/>
	88		88

Results of operations:

Recoveries in	69
Deaths in	7
Not stated in ..	4
	<hr/>
	80

In eighteen of the eighty cases operated on the ovaries and tubes were returned to the abdomen. In two cases the ovaries were removed and the tube returned to the abdomen. In two cases the hernia recurred and the other ovary was found in the sac.

Tubal pregnancy within the hernial sac occurred in five cases. In one case the uterus was pregnant in the pelvis, while the ovary and tube were in the hernial sac. There was strangulation in eleven cases, twisted pedicle in thirteen, cystic ovary in six, tuberculosis of the tube in two, and sarcomatous ovary in one. In eight cases intestine or omentum was mentioned in the sac and in three the vermiform appendix. The ages range from birth to fifty-two years.

Macnaughton, George W. F., 1893. *Remarkable contents of a left inguinal hernia; death from rupture of small intestine. Lancet*, Lond., vol. i, Mar. 4, pp. 470-471.

Male, aged thirty-one, in Worcester County and City Lunatic Asylum, half an hour after breakfast on Jan. 16 1893, complained of cramping pains in abdomen, and vomited. Tense left inguinal hernia. Died same day. Autopsy showed rupture of bowel. The ileum, for fully 4 feet below this level, until it passed into the hernial sac, contained blood and mucus. On reflecting the skin from the hernial swelling there was fibrous sac beneath, which on puncture

exuded from 5 to 6 ounces of a muddy serous fluid. On completely laying bare the contents these were found to consist of nearly 3 free of healthy small intestine, the cecum with an elongated vermiform appendix, 5 inches of the ascending colon, and a considerable portion of the mesentery.

Bates, T., 1897. *A case of inguinal hernia with bladder in the wall of the sac.* *Lancet*, Lond., vol. ii, pp. 917-918.

Male, aged sixty-four, suffering from retention of urine, was admitted to Worcester General Infirmary, July 30. Catheter was passed readily and urine withdrawn; small tense right inguinal hernia noted. Attempts to reduce failed. Returned the next day with the same symptoms as before; was put to bed. Reduction later in the day was successful. Recurred same day. Alimentary canal was freely drained by castor oil. Operation was decided upon when repeated attempts at reduction of the hernia had failed. Sac was opened and found empty; ligation at its neck; cut off and stump replaced in abdomen. Then another and thicker sac was found lying internal to, and partly behind and adherent to, the first one, and having a tached to it several large tags of fat. This second sac was opened and found to be the bladder. Wound was promptly sutured, tags of fat ligated and removed, and the skin incision was sutured over the unreduced wounded portion of the bladder, a drainage tube being inserted along the whole length of the incision with its ends protruding at each angle of the wound. Good recovery. Cause of the condition appears obscure. The most commonly held view is that the bladder is dragged through the ring by a hernia to which it is adherent.

Mr. Treves reported a case from which he argues that it is due to a growth of prevesical fat along the inguinal canal which drags the bladder finally through the ring.

Adler, James E., 1908. *Torsion of an appendix epiploica in a bilocular hernial sac.* *Lancet*, Lond., vol. ii, Aug. 8, pp. 377-378.

Woman, aged seventy-two, admitted to London Hospital, June 10, for strangulated hernia (inguinal). Had suffered with a reducible inguinal hernia for twenty years. Wore a truss. The day before admission reduction had failed. Anesthetic was given but reduction failed. Usual operative measures followed. "Lying in an edematous sac was a cord-like mass of omental tissue which ended below in an enlargement of about the size of a chestnut. The cord was tightly twisted on itself and contained ten half turns, and except for the large distal extremity, which was bound down to the sac by recent adhesions, the whole was lying free in a hydrocele of a hernial sac. The neck of the sac tightly constricted the cord-like mass of tissue and this on being followed toward its abdominal end was found to pass through into a second sac. The cord-like mass was found to be attached to the large intestine and proved to be an enlarged, elongated appendix epiploica; this was ligated and

then removed. The sac was twisted up and obliterated and the operation completed in the usual way. The patient made an uninterrupted recovery."

Jacquemin, Francis, 1905. *Étude clinique de l'appendicite herniaire inguinale et crurale*. Thèse, Paris, 99 pp.

Jacquemin has compiled a number of cases of inguinal and crural hernia containing the appendix.

His statistics showed the incidence of sex to be forty-five males and thirty-two females. He found that appendiceal hernia was much more frequent in inguinal than in crural hernia.

Bariety collected eighteen observations of appendiceal hernia; he found twelve inguinal, two on the left side, and six crural hernia.

The literature apparently does not contain any cases of appendix hernia in left side in women. In males the statistics show three cases of left inguinal appendiceal hernia, and one left crural. The three observations of left inguinal appendix hernia are reported by Herbert, 1878, *Med. Times and Gaz.*, vol. ii, p. 48; Schwarz, 1898, *Centralbl. f. Chir.*, p. 748; Vautrin, 1898, *Rev. de gynec. et de chir. abdom.*, Par., Fev. 10.

From a clinical point of view nothing is gained by separating appendicular strangulation from hernial appendicitis, the lesions are identical, the cause only differs, the symptomatology is the same.

Discusses the symptomatology in detail and classifies the various types of appendicular herniæ. Prognosis is bad.

In conclusion he states that under the term hernial appendicitis one comprehends an inflammation of the ileocecal appendix in a hernia, that is the appendix alone, or properly so-called "appendicite herniaire preprement dite," or when associated with other organs, such as epiploon, cecum, intestine, etc., "appendicite en milieu herniaire."

Hernial appendicitis may occur at all ages, but is most common in advanced life and in old persons. In males it occurs almost exclusively at the level of the inguinal canal, in females almost exclusively at the crural ring. There has been reported left hernial appendicitis, but only in males. As in abdominal appendicitis, it may be divided into acute and chronic. In view of its special site it presents all of the appearances of a simple reducible or irreducible hernia, an intermittent hernia with painful crises, hernial phlegmon, strangulated enterocele or epiploitis; but it is the omental hernia which it simulates most closely.

The prognosis is very grave if one only practises taxis and tem-

porises, but it is better after early intervention and this should be the rule.

Concludes his thesis with a large bibliography of the subject.

Massoulard, 1906. *Etranglement herniaire de l'appendicite et appendicite herniaire*. Arch. prov. de chir., Par., vol. xv, pp. 220-236.

Massoulard draws attention to the distinction between a hernial strangulation of the appendix and appendicitis with hernia.

In a hernial appendicitis we have an inflammation of an appendix which has descended into a hernial sac.

In an appendix noninflamed which may become strangulated at the level of the hernial ring or the neck of the sac we deal with an estrangulation of the appendix and not with an appendicitis.

Cites a number of cases and adds little to what is reported in the thesis by Jacquemin.

Concedes that from a diagnostic point of view it is practically impossible to tell whether the symptoms are due to strangulation or appendix hernia or a hernial appendicitis.

Treatment should be radical and early. The prognosis is good the earlier the operation is performed.

Tubby, A. H., 1897. *Some unusual cases of hernia*. Med. Press and Circular, vol. cxv, No. 12, Sept. 22, pp. 285-286.

Male, aged three years, admitted to Westminster Hospital, June 14, 1897. Strangulated congenital left inguinal hernia. The sac contained the cecum, the appendix ceci, a portion of the colon (ascending 3 inches) and some small intestine. Operation. Recovery. Hernia of the cecum, appendix and ascending colon on the left side.

Girl, aged four months, admitted to Evelina Hospital for Sick Children, on March 27, 1895. Left interstitial inguinal hernia of both ovaries and Fallopian tubes. Operation. Died. Autopsy pointed to the probability that the round ligament of the left ovary had been deprived of its blood supply, and become gangrenous, and so instituted the cellulitis from which the child died.

Savariaud and Cassard, 1911. *Double hernie inguinale: Entéro-épiplôcele à droite cæcum et appendice à gauche*. Bull. et mém. Soc. anat. de Par., vol. lxxxvi, pp. 502-503.

Male, aged five years, double inguinal hernia. Operative intervention Apr. 26, 1911. Right hernia contained small intestine and omentum; resection of sac and Bassini. Left hernia was much larger and sac contained cecum, appendix, and 10 to 12 cm. of ileum. All parts of the intestines were adherent one to another. Removal of appendix, separation of adhesions, reduction of sac contents. Bassini. Recovery.

States that the statistics of Hildebrandt and Gibson give twenty-four left hernias with appendix and cecum as contents, and 128 right forster collected fifty-six cases of left hernia without inversion.

Bonvoison and de Cumont, 1910. *Hernia inguinale congénitale double avec volumineuse hernie étranglée à gauche, contenant l'appendice.* Bull. et mém. Soc. anat. de Par., vol. lxxv, pp. 156-157.

Male, age sixteen months, had congenital double inguinal hernia. Strangulation of left hernia containing appendix which contained thirteen glass beads or pearls and a small mussel shell which did not cause any lesion in the appendix *per se*. No lesion of appendix found after removal. Recovery. Mother was milliner and child evidently got hold of some of her materials.

Jayle, 1893. *Hernie inguinale gauche comprenant la presque totalité de l'intestin.* Perforation de l'estomac. Péritonite suraigue. Bull. Soc. anat. de Par., vol. lxxviii, pp. 42-44.

Male, aged fifty-five, had left inguinal hernia size of infant head for long time. Symptoms of subacute peritonitis set in with death in a few hours after seen. Autopsy showed abdomen considerably distended. Perforation of the anterior wall of the stomach. Almost all the intestines were found in the inguinal hernia. The contents of the hernial sac were: 1. a piece of omentum 12 cm. by 2 cm., 2. small intestine except duodenum and first 10 cm. of jejunum, 3. cecum and appendix, 4. transverse colon and upper portion of ascending colon, 5. descending colon and sigmoid, 6. atrophied large omentum. There were no adhesions between the intestinal loops or skin. The cause of the gastric perforation could not be elicited. They attribute it possibly due to an acute gastritis followed by perforation.

Mérigot de Trégnay in his thesis cites four or five similar cases, says Jayle. The condition is rare. The existence of a complete sac, and absence of any adhesions allowed a ready cure.

Stoney, R. Atkinson, 1898. *Hernia of the iliac colon.* Tr. Roy. Acad. M., Ireland, Dublin, vol. xxvi, pp. 397-414.

Discusses cases of femoral and scrotal herniæ. Quotes from the International Text-book of surgery, as follows: "The sigmoid flexure may form the whole or a part of the contents of the sac in a left inguinal and more rarely in a left femoral hernia. Much that has been said of cecal hernia applies also to sigmoid. The sac may be partially wanting. This variety is much rarer than the cecal form in children, though in adults it is nearly as common."

Quotes Treves System of Surgery, as follows: "A congenital hernia of the sigmoid flexure may be met with in the left inguinal region. It is produced precisely the same way as the congenital

hernia of the cecum, the sac may be complete or incomplete, the bowel and the peritoneum with which it was connected having been simply displaced downward into the hernia sac."

Quotes others and Anderson in particular who states "variations in the line of attachment of the sigmoid mesocolon are probably not very rare. In the past year I have met with two instances in the dissecting room of St. Thomas' Hospital in which the curve of the iliac attachment, instead of crossing toward the sacral promontory, ran down nearly to the level of Poupart's ligament. . . .

Were a left inguinal hernia to occur in cases of this kind there would probably be a complete sac containing colon and perhaps omentum; but there is a closely allied abnormality, hitherto seen only in the living subject during surgical operation, which permits a peculiar form of sacless hernia still undescribed in text-books. Here the intestine, bound to the iliac fossa by a layer of peritoneum covering its front and sides, runs downward and forward in the course described as far as the inguinal region, but the peritoneum is reflected in such a way as to leave an uncovered portion of the gut in contact with the posterior wall of the inguinal canal. In this case, should the state of the abdominal wall permit a hernia to occur, the protruding portion of the colon would be partially or wholly sacless, and the division of the superficial coverings of the tumor would at once expose the muscular wall of the gut, the peritoneum appearing only as a sort of pouch attached to the concave or abdominal aspect of the coil. Such a hernia, if wholly sacless, must almost necessarily be small; but if it be supplemented by a hernia of the pelvic coils of the sigmoid colon it may assume large dimensions and present an incomplete sac. At least six examples of this peculiar form of hernia have been met with."

Studied the matter from all angles and arrives at the conclusion that in hernia of the iliac colon there is never a complete sac except in those rare cases where the bowel has a mesentery originally and is herniated in the ordinary manner like any other portion of the intestine.

W. B. De Garmo, in his book on "*Abdominal Hernia*," says that the contents of a hernial sac may be either omentum, intestine, or in fact any of the movable contents of the abdomen, and adds:

"In some rare cases even those organs that are not ordinarily considered movable, as the kidney or a part of the liver, have been found in the hernial sac."

Again, when referring to the "many unexpected things that have been found in the hernial sac," the same author says:

"As has been previously stated, all of the movable organs of the interior of the abdomen are found in it. . . . The stomach, liver, gall-bladder, spleen, pancreas, and kidney have all been reported as found in inguinal sacs, as well as concretions of various shapes and sizes."

But, although Dr. Garmo and a few other text-book writers say that the kidney sometimes, but *very* rarely, is found in a hernial sac, they all, with one exception, fail to cite any instances of such cases. The exception is Jonathan Macready, who refers to a case described by Dr. E. C. Wendt in which the kidney has prolapsed and was found in the right inguinal canal.

Macready also refers to a case cited by Dr. Deipser in 1887, in which, in a woman, sixty-three years of age, a right inguinal hernia contained the kidney.

Wendt's case was a woman eighty-six years old who had, for years, worn a truss for a supposed inguinal hernia. She died in a hospital from various senile disorders, and autopsy revealed the following conditions:

"At the autopsy the right kidney was found connected by a firm band with the uterus, and was also situated in the inguinal canal. the portion protruding externally being that which had been mistaken for a hernia. It was evidently a congenital condition, and the kidney had no visible pelvis. The ureter was very much shortened. The kidney on the opposite side showed no special change. The renal artery in the inguinal kidney did not spring from the abdominal aorta; it probably arose from the iliac artery. There was no suprarenal capsule connected with the kidney removed from the inguinal ring, although it might be that one existed above."

That such cases are of extremely rare occurrence is evidenced by the fact that a careful search through numerous text-books dealing with the subjects of movable kidney and hernia, as well as a study of the periodical literature for over sixty years, has been necessary to secure the few cases noted in our bibliography.

Dr. J. G. Henry reported, in March, 1910, a case of a right inguinal hernia in an infant which had developed within a few days of the baby's birth in April, 1907. The hernia had been held in place by a support from the end of the first month of life, but when she was three months old an operation was performed, about which Henry writes the following:

"On opening the hernial sac, much was our surprise to find, instead of intestine, a kidney which had evidently long since ceased its function. Dr. Stimson was of the opinion that it had never

functionated. It was ligated and removed and the baby made an excellent recovery and is at present an unusually strong and healthy child."

It is evident that Dr. Henry (writing in 1910) had not heard of the cases cited by Wendt and Deipser, since he says: "I do not recall having seen in medical literature a report of prolapse of a kidney through the inguinal canal."

As we can find but three recorded cases of the kidney being found as the contents of inguinal herniæ, and one of these diagnosed only at autopsy, we take the liberty of adding in greater detail our experience with one more. Let me state at the outset, that in handling this case we were disturbed beyond the usual, owing to the fact that we did what we have not since done; that is, operated without previously examining the patient. The physician referring the case to us is one of such unusual training and intelligence that we were led to follow his diagnosis, and plan our operation, without having seen the patient before we approached the operating table ready to make the incision.

Mrs. J. A. S., aged thirty-eight, resident of Detroit. Family history unimportant. A few points in her past history, subsequently obtained, are important. First, she had never suffered any illness necessitating her remaining in bed. Second, she never had any subjective urinary symptoms. Third, her first menses occurred at the age of 12, and was always painful. Periods too frequent with profuse flow; the hemorrhages increased during the past year.

About nine years previously she noticed a lump the size of a hickory-nut in the region of the right internal abdominal ring. It remained about same for eight years, when it came lower and appeared to double in size. At this time, it also became very painful.

Operation, August 22, 1914, under preliminary hypodermics of morphia and scopolamine, nitrous-oxid-oxygen, and field blocking anesthesia.

Made the usual skin incision and then found that the mass could not be pushed up into inguinal canal because adherent to labium majus. An elliptical portion of the labium majus was excised in order to free the mass which now gave me the impression that I was dealing with a kidney. However, it being almost beyond identification, an opening was made in the peritoneum. The right kidney space was then explored and found deserted. It then occurred to me that it was well to know something, at least, of the left kidney. Sweeping the hand across the peritoneal cavity, the left kidney was found normal in size, location, and touch. My hand in the pelvis found, what proved to be, a parovarian cyst $3\frac{1}{2}$ inches in diameter, a subperitoneal fibroma the size of a walnut upon the fundus uteri, and a hydrosalpinx on the right side. The exploratory incision into peritoneum was then quickly closed, fol-

lowed by nephrectomy of the useless right kidney, and the inguinal canal closed in the usual manner. Time from starting the gas, forty-two minutes.

A median incision was then made, the parovarian cyst, the uterine fibroid, and right tube removed. Time of second operation, including closure of wound, twenty minutes. Altogether one hour and two minutes were consumed. The kidney was composed of a mass of small cysts about $\frac{1}{2}$ inch in diameter. The recovery of the patient, uneventful. She left the hospital at the end of two weeks in fine physical and psychical condition.

Recently advice from her states she has remained well uninterruptedly.

347 THE NICHOLAS.

DISCUSSION.

DR. HERMAN E. HAYD, Buffalo, New York.—I presume all of us have had the experience of finding everything in the contents of a hernia, but perhaps some of you have not had the unpleasant experience of having a patient upon whom you have operated fail to empty his bladder. I recall the case of a man, forty years of age who had been operated on five years before and suppuration set in, the wound broke down, and the hernia returned. He came to me and I operated on him. I found the tissues very greatly adherent. I was very, very careful in my manipulations and succeeded in separating all tissues that were stuck together, and closed the wound and congratulated myself on having done a beautiful piece of work. In the evening I went to the hospital, as is my usual custom, and saw him at eight o'clock. Seemingly he was in splendid condition, his pulse was 72 or 74, and temperature normal. He said he felt fine. I asked him if he had passed urine and he replied he had not. A vessel was procured for him in which to pass water as I was anxious to see the condition of his urine as I do in all cases, and particularly where I do a supravaginal amputation, but he told me he could not pass water. I ordered a soft catheter, passed it, and succeeded in withdrawing about 2 ounces of bloody urine. I said to him, I am sorry, you have got to go upstairs and be operated on again. He declined at first, but after a little persuasion and insistence he consented. In the operating room, on examination, I found there was a nick in the bladder large enough to admit two fingers, and the peritoneal cavity contained a great deal of urine. I put a ligature around the opening, tied it and then sewed over by Lembert suture, inserted a drainage tube, and the man got well in a short time.

The point I want to bring out is the importance of having these patients urinate because when you least suspect it, you may nick the bladder.

DR. FRANCIS REDER, St. Louis, Missouri.—It has been my misfortune to injure the bladder twice, and it has made me exceed-

ingly careful in my dissections. The great danger from injury to the bladder is, of course, infection. There is no positive way of actually determining in time during the dissection whether or not the bladder is being encountered. A vague sign, which however is usually pronounced enough to arouse suspicion, is the unusual and continued oozing during the dissection of tissues that in an ordinary hernia operation should not ooze so much. Such oozing should cause the surgeon to proceed cautiously, as he may be working in peri-vesical tissue.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—One unique cause has not been mentioned, but which led me nearly into a bad error. An old man, with a chronic inguino-scrotal hernia, which was not reduced for years, it being left-sided, presented symptoms of intestinal obstruction. I made an incision and found the large gut, the sigmoid, as I recall it, lying loose, the size of an infant's head. I was not quite satisfied and did not know just how to explain the acute symptoms. I separated the adhesions of the large gut, and I found another cavity inside of this mass into which the small intestine had herniated and had become gangrenous.

DR. JOHN F. ERDMANN, New York City.—I recall a rather unique case in a child, under two years of age, with twisted strangulated tube. I operated on that case in the last two years resorting to excision of the tube at the time.

THE SURGERY OF THE APPENDIX.*

BY

JOHN W. KEEFE, M. D., F. A. C. S., L. L. D.,

Providence, R. I.

THERE are too many deaths due to appendicitis, and the ill-timed advice given by physicians is often the cause. The medical profession and the laity must be taught that castor oil or any other cathartic should never be given in the early stages of an attack of pain in the belly. How often do we hear it said: "Oh it is simply a case of intestinal indigestion due to something you have eaten. Take a good dose of oil and you will be all right in the morning." There are many physicians to-day who do not realize how many patients they have laid in their graves by this, seemingly, innocent advice. The free administration of opiates in the early stages of the disease frequently mask symptoms and give the physician and patient a false sense of security, causing the loss of valuable time and frequently of life.

* Read before the Twenty-eighth Annual Meeting of the American Association of Obstetricians and Gynecologists at Pittsburgh, Pa., September, 1915.

Mothers should be taught never to give a cathartic in an acute abdominal disturbance. Rest in bed, absolutely nothing by the mouth, hot or cold applications to the abdomen, and no opiates should be the early treatment.

I have observed that an intern who, while serving in a hospital, will invariably urge immediate operation at any time, either day or night; will yet, when he enters private practice, be swayed by the family, or perhaps by other reasons, to postpone operation, prescribe opiates and cathartics and wait for further developments.

Should the disease progress and perforation take place, the infected material which nature was trying to confine to the right iliac region by adhesions, is now, by the peristalsis of the bowel, spread about the abdominal cavity. Then the patient is said to have "a change for the worse" and is hurriedly sent to a hospital, perhaps late at night, for an operation to be performed, in many instances, by an intern handicapped by incompetent assistants and other disadvantages.

The physician called in the early stages of appendicitis has a tremendous responsibility. He should be a master of the situation; possess the courage of his convictions and not allow his better judgment to be turned aside by the arguments of the family or the friends of the patient. He should act promptly and see that the appendix is removed within the first twenty-four hours.

Usually the symptoms and signs are sufficiently clear, and any man who has a license to practise medicine may diagnose appendicitis. Mechanical factors, as angulation or kinks, due to adhesions or bands, undoubtedly play an important rôle in the causation of this disease in many instances. There is always found more or less obstruction of the lumen of the appendix when this organ is diseased. Indiscretions in diet may precipitate an attack of appendicitis, and meat diet has been thought by some to increase the tendency to gangrene. Concretions may produce ulceration of the mucous membrane, thus permitting the entrance of bacteria at the site of the ulcer. The pressure produced by concretions may interfere with the blood supply, cause obstruction, perforation and gangrene of the appendix.

Rosenow has made clear to us that a focus of infection in some remote part of the body, for instance in the tonsil, may through the blood stream set up an inflammation in the appendix. He believes that "appendicitis in the absence of foreign bodies, commonly is a hematogenous infection, secondary to some distant focus; that it develops when, for some reason or other, the organisms

in the focus, usually streptococci, have acquired an elective affinity for the appendix, and at the same time gain entrance into the circulation." He noted the frequent occurrence of appendicitis when throat affections are prevalent.

In examining 539 appendices microscopically, Stanton found definite obstruction of the lumen of the appendix demonstrable on the first day of the disease. He says, "The appendix was invariably found distended, distal to the point of obstruction. The microscopical changes shown on the first day consist of an intense diffuse polynuclear leukocytic infiltration, focal areas of hemorrhage, and necrosis involving all the coats of the appendix. Fibrinous or fibrino-purulent exudate was found upon the peritoneal surface. Extensive serous exudates are noted at the close of the first twenty-four hours of the attack.

The exudate of the first day is, usually, free from bacteria. By the second day we are contending, not only with the inflamed appendix, but with the associated peritoneal infection. Perforation of the appendix commonly occurs before the end of the second day. During the second day we find intense leukocytic infiltration involving all the coats, with ulceration of the mucosa. About three-fourths of the cases show fibrino-purulent exudate on the peritoneal surface. On the third day there is evidence of beginning repair showing the presence of fibroblasts. On the fourth day the gangrenous cases show large areas of complete necrosis and an increase in the number of fibroblasts. Focal areas of hemorrhage into the exudate, from newly formed blood-vessels, are seen. Most appendices are perforated bacteriologically after the first few hours following the attack." These pictures emphasize most emphatically the desirability of removal of the appendix the first day of the disease and the positive abstinence from purgatives.

While it would seem that the symptoms of acute appendicitis are sufficiently well known, it is a fact, in many cases, we find physicians in doubt as to the diagnosis. We all will agree that pain of sudden onset about the umbilical or epigastric region and, within twelve hours, most marked in the right iliac region, is the first symptom noted. The pain may be easily borne or may be excruciating in character. The pain often ceases following perforation. Nausea and vomiting usually occur, yet both these symptoms may be absent. Sensitiveness to pressure near McBurney's point is quite constant, although it may vary considerably in degree. Muscular rigidity, giving a feeling of resistance on palpation, is seldom found wanting. Elevation of temperature is present, but

usually not high, except in children. Occasionally a patient with very low resistance shows a normal or subnormal temperature. The temperature may be normal even after perforation. Upon arrival at the hospital patients frequently have a low temperature due to the effect of cold, or the shock of transportation from the home to the hospital, or due to gangrene. The third day the temperature and pulse may be lower, yet the leukocyte count is usually higher. This is a valuable sign. It is the lull before the storm. Little attention should be given to the temperature if the history and other symptoms and signs are definite. Increase in the leukocyte count, especially an increase in the polymorphonuclears, is often of great assistance in the diagnosis of appendicitis, although we have seen a normal count with the appendix perforated. We should bear in mind that the laboratory is not infallible, but that it is an important aid to us in our work.

The preoperative treatment should prohibit everything in the way of food by mouth; we should resort to lavage of the stomach if vomiting is troublesome. Locally, ice gives comfort in some cases, while hot applications are more soothing in others. Small rectal enemas should be given to keep the lower bowel free.

The anesthetist and the selection of the anesthetic are of importance. Ether will be selected in the majority of cases. Gas-oxygen may be desirable in some instances; but local anesthesia, I believe, will be employed more frequently in the future. Operation, before the end of the first twenty-four hours from the beginning of the attack, should be insisted upon as the safest course to pursue. One can never tell the outcome in a given case of appendicitis.

Where shall we make our incision? When it is found desirable to examine the stomach, duodenum and gall-bladder as well as the appendix at the time of operation, the right rectus incision is to be preferred. When we are dealing with interval cases and there is no reason to suspect trouble with the stomach, duodenum, gall-bladder or left pelvic region, we select the McBurney or muscle-splitting operation as the one causing the least trauma to the tissues involved. Where we are dealing with a circumscribed abscess the incision should be made over the most prominent part of the tumor and the muscle-splitting operation again is the most suitable. When the appendix cannot be readily found, be content with opening and draining the abscess without removal of the appendix. However, I have seen a few patients who have had appendicitis a second time in the stump left after a portion of the appendix had sloughed and come away with the pus forming the abscess.

We are old fashioned enough to believe that the McBurney incision is the best for acute cases, even though we find it necessary to drain or remove a diseased right tube and ovary. The McBurney or gridiron incision allows sufficient room for the performance of any operation on the appendix, or the right tube and ovary. We can palpate the uterus and both tubes and ovaries; and, in a few instances, I have removed the left tube and ovary through this incision. We have fewer hernias and a stronger abdominal wall left after the muscle-splitting operation.

In a series of 129 cases occurring in my service at the Rhode Island Hospital it was found necessary to drain in sixty-five cases, showing the tendency of the profession to delay operating. During four months we operated fifty-five times, with one death. Fifty per cent. of the cases were drained. The morbidity in these drainage cases should be avoided. The tendency to a long drawn-out convalescence, due to fecal fistula and secondary abscesses, is unfortunate to say the least. We operate on most of the cases shortly after they reach the hospital. The Ochsner treatment, is not understood by the profession and consequently has done great harm.

The mesoappendix is ligated and the appendix clamped with two Ferguson clamps and cut between the clamps. Then the stump is cauterized with carbolic acid and alcohol applied. A purse-string suture of Pagenstecher linen is placed in the cecum about the stump; the stump is then ligated and the purse string tied. A number of deaths from hemorrhage have followed the nonligation of the stump. I realize that there are many other methods of treating the stump, but the method just described is very safe and satisfactory.

One or two cigarette drains are all we have found necessary. They are removed at the end of twenty-four or forty-eight hours and replaced by rubber tissue drains. The wound is irrigated daily with a normal salt solution and thymol iodide or bismuth subiodide or iodoform is dusted over the wound. We believe that these powders are of distinct value in suppurating cases.

The wound is closed in layers with buried chromic catgut. The peritoneum is first united, then the separated muscular fibers of the internal oblique and transversalis are brought together and later the external oblique. The areolar tissue is united with plain gut and a subcuticular silver wire suture approximates the skin.

Rapidity in operating is essential when the patient is prostrated. The surgeon should not attempt too much. He should open the

peritoneal cavity, attend as quickly as possible to the pathology found, drain and close the wound. Stab-wound drainage is, usually, not necessary; but, occasionally, it is of service.

The after-treatment consists of the Fowler position, withholding of food, lavage of the stomach if necessary, frequent rinsing of the mouth, tap water by rectum, and small doses of morphia. On the third day the bowels are moved by enemata, and we have found eserine and pituitrin in some cases of value where distention with gas was troublesome.

Appendicitis is a disease amenable to surgery. Early operation by a competent surgeon should be attended with no mortality. When we know this to be a fact and realize how easy it is to remove an appendix in the first twenty-four hours of the disease, is it not regrettable to hear of so many dying from this disease because of delay? Both the physicians and the laity are to blame. They must become enlightened. Though much has already been said and written on the subject, it is our duty to continue to raise our voices and cry out "Don't kill patients the victims of appendicitis, with cathartics." Make the diagnosis early. Advocate operation before the end of the first day and see to it that a man well qualified to do surgery performs the operation.

262 BLACKSTONE BOULEVARD.

A PROGNOSTIC SIGN IN ACUTE SUPPURATIVE PERITONITIS.

BY

HUGO O. PANTZER, M. D., F. A. C. S.,

Indianapolis, Ind.

Synopsis.—THE presence within the abdomen, of a free or encapsulated serous or seropurulent fluid, which is practically without odor, *by the side of an encapsulated foul material*, indicates a strong systemic defensive activity of distinct prognostic value.

There are cases of peritonitis which, by their violent symptoms and the conditions found at operation, show no apparent hope of recovery and which, notwithstanding, make straightway for re-

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covery. It is of prognostic interest to know the signs which at an operation, in a given case, reveal this probability.

In June, 1906, on a distressingly hot summer day which seemed to accentuate the gravity of the case, there was brought to me by rail from long distance, an otherwise sturdy male babe six months old. The child had been taken acutely ill a few days before and had at once revealed the characteristic signs and symptoms of an acute general peritonitis of probable appendiceal origin. Temperature was 104° F., pulse feeble, 170 to the minute. At the operation there was found much free fluid within the abdomen, cloudy with pus, but odorless. About the ileocecal coil were extensive adhesions enclosing an abscess containing about 45 c.c. of creamy and extremely foul-smelling pus and the gangrenous appendix. The case seemed utterly hopeless; yet it turned immediately to recovery. With three drainage tubes within the abdomen the babe was found cooing merrily and taking its mother's milk the very next day; and from that time on progressed to full and speedy recovery.

The striking feature of this case was the different morbid fluids within the abdomen; a cloudy and odorless fluid was present, throughout the abdominal cavity, by the side of a stinking abscess. Could it be that the nonodorous fluids found about the appendiceal abscess were indicative of a successful effort of defense on the part of nature? In other words, did it denote a capable measure of defense?

Parallel conditions prevail in cases that are not operated upon but which, after a long and oftentimes perilous course, terminate in recovery in consequence of a spontaneous external or intrainestinal rupture of an abscess.

With many subsequent cases revealing a like experience, it may now be set forth that such finding has reliable prognostic value. The defensive material thus produced by nature, in single instances, may vary in its characteristics. It may be either clear or quite clouded serum. The serum may be free within the abdominal cavity, or encysted in one or more pockets. And, conversely, the original morbid material may be variously encapsulated in one or more pockets, and vary in degree or kind of odor in the several pockets in the same case.

The writer, throughout this period of his observations, has reported on several occasions at previous meetings this interesting finding, but never in a formal paper. To the knowledge of the writer there appears no report of a similar observation

in current literature. This seems to warrant its formal presentation here.

601 HUME-MANSAR BUILDING.

DISCUSSION ON THE PAPERS OF DRS. KEEFE AND PANTZER.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—There is no such thing as appendicitis. Some years ago in every case of appendicitis I could put my hand on, whether the appendix was inflamed or not, where I was looking for something in the abdomen I took out the appendix and buttonholed the cecum, and I found invariably that where I had what we call appendicitis there was really a cecitis. I worked up quite a little data on this subject, and my housekeeper burnt up my papers, so that I was unable to complete my investigations on this subject. With appendicitis you have cecitis, and generally speaking my observation is that appendicitis begins as a cecitis and works down. If you have the vegetative type of appendix, wide lumen, it drains well, and you never have the acute surgical type. It may lead to a chronic fibroid ceco-appendicitis, which in time may lead to the surgical condition. If you have the carnivorous type, with swollen mucous portion, you have stasis of the secretions of the appendix and an operation is needed. It may take two or three attacks in the vegetative, before you have a sufficient amount of fibrosis at the entrance of the appendix into the cecum to close it up and cause trouble.

With reference to the incision, it should be large enough to enable you to explore the abdomen while you are about it, provided the local conditions will permit. The 1-inch incision has gone, and I hope never to come back. You must have inspection because we all know that appendicitis is prone to make trouble in the right kidney, the gall-bladder, in the stomach, and pancreas, and it is your duty to explore the abdomen if the conditions will permit, while you are there.

As to drainage, I once wrote a paper on the omentum, which I regarded as the best article I ever wrote. The omentum is a wonderful structure. We as surgeons say we drain and we do not; the omentum does the drainage for us. If you have an infected wound the omentum will take care of it. Sometimes we put in a pack to wall off the condition which surgery cannot remove, but ordinarily the omentum will do the work much better.

With reference to the remarks made by Dr. Pantzer, he will find that Nature or some unknown source will draw staphylococci into the abdomen. I have reference now to the staphylococcus albus. All the other germs are due to a temporary condition. According to researches, the staphylococcus albus plus the active leukocyte in the serum will bring about a protective immunity of the peritoneum.

DR. FRANK D. GRAY, Jersey City, New Jersey.—My friend Dr. Dickinson says there is no such thing as appendicitis. I think he is wrong. Those of us who operate repeatedly on conditions we call appendicitis and have found nothing visible or appreciable but appendicitis, and no indication of cecitis whatever, and have removed

the appendix and have had our patients recover, which they would not have done if they had simply cecitis, rather question the validity of the statement that there is no such thing as appendicitis. Granted that many cases are a combination of appendicitis with adventitious membranes, films, and so forth, with occasional cecitis, then the statement has some approach to the truth.

The cause of appendicitis, I believe, in the vast majority of cases is some mechanical deformity. My experience has led me to believe that almost all pathologic appendices are kinked or twisted or stricured in some way. The most usual thing is a short meso at some point which kinks the appendix, or there is an overlapping adventitious film which does the same thing. You have a blockade, a lack of free drainage, and a susceptibility to infection.

As to drainage, we undoubtedly used to drain more than we should have done. We perhaps now err on the other side and drain less frequently than we should, but this is a question of individual judgment in every case.

As to what to drain with, I would simply say do not drain with gauze. Gauze is a dam, and it will keep back secretions, pus, or whatever you want to get rid of. The ideal drain, if you want to drain, is the one of Peple, of Richmond, Virginia, which has brought to our attention three or four years ago, and known as the Peple drain. It is made up of a split rubber tube containing folded rubber dam. It drains along the whole course through the split tube. It has capillarity, supported by the rubber dam inside. It is easily removable. As to the time of removal, two or three days is the usual limit, for at that time, if you use a drainage tube, or whatever you use for drainage purposes, the surroundings are well walled off, and on taking out the drain a natural drainage tube—the sinus—is left.

With reference to the paper of Dr. Pantzer, I was impressed many years ago with perhaps the converse of what he stated and which might be put in this way, that in cases where we do not have adhesions, but we do have a great deal of serous fluid in the peritoneal cavity, we may give a bad prognosis. In other words, when Nature is active, with the opsonins at work, you get adhesions and a walling off. When you have simply a free flow of fluid into the peritoneal cavity look out for storms.

DR. RUFUS B. HALL, Cincinnati, Ohio.—I do not want to discuss these papers, but I do want to discuss the discussion a little. I do not want it to go out from this Association that we are afraid of drainage in cases of appendicitis. While the omentum is a good doctor and will take care of a lot of filth and dirt, yet the question of drainage in acute appendicitis is a very important one to the patient as well as the doctor and his reputation. It is not always easy to say from the conditions present which patient should be drained, but it is a good working rule, as I take it, and I have done many of these operations, to drain all acute cases. In an operation that is done in the interval, ordinarily you do not have to drain at all, but all *acute* cases should be drained. Perhaps a great many of

them will get well without drainage, but a great many of them will die if you do not drain. I have a case in mind that emphasizes this very much.

Just a few years ago the only child, about sixteen years of age, of a doctor in one of the cities in Ohio had acute appendicitis. They sent to one of the large cities for a specialist in surgery. This surgeon saw the patient within twenty-four hours from the time the pain in the abdomen was felt. He said here is a case of acute appendicitis and it was fortunate that he was to be able to operate on this boy now just at a time when his life could be saved. He said that this is a case that ought not to be drained. It would take care of itself, said the surgeon, and the incision was closed without drainage, and the boy was dead in forty-eight hours. It is unnecessary for me to repeat histories of this kind. If that boy had received any kind of drain he would have recovered. He died for want of a drain, and many of these acute cases, if drained, will not die.

DR. ARTHUR THOMAS JONES, Providence, Rhode Island.—I would like to take issue with the statement that this type of appendix which we see, that is, the open one that empties itself freely is of a perfectly harmless type. A lot of very good men have so stated that it empties itself and does not give trouble. I believe that type of appendix does give trouble in many instances, and I believe when we come across that type of appendix in our abdominal operations, it should come out at that time. It seems to me, it is just as unwise to claim that an appendix of this type does not give trouble as it is to claim that Meckel's diverticulum should not give trouble. We know as a matter of fact that the diverticulum does give trouble. It does not do so in every case, and many patients die with a Meckel's diverticulum and not know they have had it. But I believe the large open appendix which we think opens freely in a great many cases does not do so. That type of case we see in patients who are suffering from so-called "indigestion." We cannot find anything else to account for it. We operate. There is nothing the matter with the gall-bladder, the stomach or the duodenum, and all we find is one of these large appendices of the "harmless type," but we remove the appendix and the patient has no further trouble. His indigestion so-called is cured. We all see a great many of these cases, and they are relieved after the removal of that type of appendix and I firmly believe that type of appendix does give us trouble, in many instances.

DR. WILLIAM H. HUMISTON, Cleveland, Ohio.—Appendicitis sometimes is quite difficult to diagnose. I have removed a great many appendices that macroscopically seemed to be perfect, but in turning them over to the pathologist he has reported structural changes not only in the mucosa but in the structures outside of the mucosa, so these cases are not acute so-called, but they give rise to a great many disturbances, especially of the digestive tract. It is my good fortune to be associated in hospital work with a physician eminent in stomach work, and he refers to me cases coming under his care for digestive disturbances, in which the history leads one

to expect, and examination reveals a pelvic disorder. He insists upon a correction of the pelvic disease, after which they respond quickly to his remedies for stomach and intestinal difficulties. In making an operation for the correction of the misplaced uterus we in a great majority of cases find macroscopic evidence of disease of the appendix, and even if we do not find macroscopic evidence of disease of that organ we remove it anyway, and the pathologist usually finds a pathological condition.

With reference to the acute cases, as has been stated, I think it is better to drain them. I think it is safer. You may not require drainage in all cases, but it is hard to distinguish when you should not drain, and if you want to have a low mortality, if you want to do the best for your patients, I would advise to put in a drain, if you are in doubt. I can drain with gauze, and gauze will drain. If you have a strip of sterile gauze well placed and do not leave the opening too small so that it constricts the gauze as it comes out, you will have good drainage. The capillary effect of the gauze will be continuous, if you keep the end of it between two pieces of dry, sterile gauze frequently changed. The moment gauze is wet it stops draining. Change it frequently.

DR. KEEFE (closing).—I shall make but a few statements in closing. First, not to give cathartics, and the next, to operate as promptly as possible, the sooner the better. Of course, we can operate late and the patient may live, but by operating late the patient at times is an invalid from three to six months and sometimes for years. We have seen fecal fistulæ which lasted for years, due to operating late. We may also have secondary abscesses and adhesions and intestinal obstruction. This morbidity is due entirely to late operation. I feel that very few of us have had the opportunity of operating within the first twelve hours, and how few times we have operated within twenty-four hours, and yet it has been definitely shown the fluids are practically free from bacteria during the first twenty-four hours. If that is so, then it is advisable to operate within the first thirty-six hours.

DR. PANTZER (closing).—The subject of appendicitis is not as yet finally adjudicated. The very illuminating work of Rosenau bears upon this question. Rosenau has shown that tonsillitis or any infection leading to bacteremia, is prone to give rise to focal disease, anywhere there is a *locus minoris resistentiæ*. This point has not been sufficiently considered with regard to appendicitis. Appendicitis is not invariably or even commonly a recent disease. Commonly the history of the case will reveal the preceding acute attacks, which, however, often go unnoticed by the side of the more obtrusive primary extraappendiceal disease and its general malaise. The appendix, on account of its anatomical form being a blind sac, is prone to become the seat of a bacteremic infection, as shown by Rosenau. Moreover, the study of appendicitis by Sonnenburg of Berlin, which was reported and accompanied by a most pertinent exhibit of pathological specimens at the International Medical Congress in Berlin in 1890, revealed that appendicitis when it comes

to clinical manifestations, commonly is but the acute exacerbation of a very chronic affair. Commonly an appendicitis is created primarily by an acute bacteremic disease of origin in a different organ (such as tonsils, teeth, external wounds, etc.) and the resultant appendicitis at first is in the form of a subacute affection. It is this subacute and chronic forerunner of the later fulminant appendicitis which gives rise to the anatomical deformities which favor not only reinfection through the blood, but eventuate in themselves the final clinical crisis. We must detect and operate these cases before the acute stage has arrived. It shall be our aim to anticipate by simple and timely procedures the heroic surgery devised by Lane and his disciples. Not only the grave clinical cases of an acute appendicitis but also the need for the heroic measures adopted to relieve intestinal stasis should be anticipated. The long smouldering chronic appendicitis should be attended to surgically before it attains the dignity of an acute emergency or crisis.

In appendicitis I have found the greatest diagnostic aid in the rectal temperature. Only within the last week there was brought from a nearby town a small boy reported to have no oral temperature of more than 99 and oftenest even subnormal temperature. The thermometer by rectum showed $103\frac{1}{2}$ degrees. The day following my operation the oral temperature was 98 degrees and the rectal 104 degrees. This shows that the rectal temperature alone is a safe criterion of judgment in these cases. Even in the subacute and chronic forms the oral temperature commonly is subnormal or normal, while the rectal will reveal variously $\frac{1}{2}$ to 2 degrees above normal.

With regard to my own paper, I wish to thank you for the kindly hearing given it. I will only say that it seems to me that Dr. Grey and Dr. Carstens failed to consider the point made, namely that *contrasting fluids* within the abdomen indicate an active and able defensive ability of the body to cope with the infectious invader.

A RARE CONGENITAL ABNORMALITY OF THE SIGMOID.*

BY

BUDD VAN SWERINGEN, M. D.,

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(With two illustrations.)

THIS paper is inspired by the following case:

Mrs. C. C., thirty-seven years of age, has suffered constipation from childhood. She is obliged to take oil to secure a bowel movement. For years she has had a cough with more or less expectoration. She is the mother of three children. Aside from these statements, nothing of importance was elicited prior to January of this year.

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The present illness dates from the latter part of September, 1914, when she visited a nearby city for the purpose of having an abortion performed upon herself. She supposed herself pregnant two weeks. A catheter was introduced into the uterine cavity to destroy the ovum and remained there till the next day. She developed pain in the abdomen, diarrhea and fever. She returned to her home in the country at the end of three weeks where she was confined to her bed until after the operation.



FIG. 1.—Conditions found after omentum had been removed. Dotted lines show the connections between sigmoid and rectum imbedded in the inflammatory mass about the left ligament and tube.

Examination of the chest was negative except for some large moist râles. No tubercle bacilli were found in the sputum. The heart was normal. Palpation of the abdomen elicited tenderness and tumefaction in both flanks. By the vagina the mass in the left side was felt to be very hard and larger than that on the right. A diagnosis of malignancy had been made by several consultants.

Blood examination showed 19,200 leukocytes with 68 per cent. polynuclears. Urine negative. The patient was pale, feverish, had lost considerable weight and was evidently septic when she was brought to the hospital.

The abdomen was opened by the median incision. The omentum, firmly adherent on the left side, was loosened with considerable

effort and packed back out of the way. The tuboovarian abscess on the right side, including the adherent appendix, was removed. While enucleating the left tube and ovary, both intimately adherent to the sigmoid, there was uncovered a cylindrical structure about 6 inches in length; it apparently originated from the side of the sigmoid and entered the lateral aspect of the rectum. After freeing it, I believed it to be a diverticulum open at one or, perhaps, both ends. As the main channel of the bowel was thought to be still



FIG. 2.—Condition after removal of both tubes and ovaries. Dark spot on sigmoid represents denuded area left by removal of ovary.

uncovered, this diverticulum was ligated at the sigmoid and rectal attachments and removed. The left ovary and tube were now enucleated and extirpated.

Preliminary to the closure of the abdomen, water was run into the rectum. Our custom is to allow 2 quarts of water to remain in the bowel. We now discovered that the sigmoid and descending colon could not be filled and that we had, evidently, destroyed the only passageway between the rectum and colon. We, therefore, anastomosed the rectum and sigmoid, by the Noble anastomat, at the site of the former channel.

Patient had a satisfactory, though prolonged convalescence, and

went home with a fecal fistula. For this she was successfully operated May 11, 1915.

Dr. C. C. Grandy sends the following report on the specimen submitted to him for examination: "The material handed me consists of a musculo-membranous tube, 4 inches long, varying from $\frac{3}{4}$ to 1 inch in diameter. The outer surface is smooth and one can see circular fibers evenly distributed over it. There are neither longitudinal fibers nor peritoneum visible. Cross-section shows a mucous membrane which is not more rugous nor thrown into larger folds than mucous membrane of the normal large bowel. When fixed by formaldehyde and stained by hematoxylin and eosin, sections show the outer layer of cells to be made up of unstriated circular muscular fibers beneath which is a rather loose connective-tissue layer which contains no glands and few cells. Next to this is a mucous layer made up of normal columnar epithelium and lymphoid cells. In this layer of lymphoid cells one sees many glands of Lieberkühn which empty into the lumen of the tube. On these findings, I should say that the specimen was a piece of large bowel of unusually small caliber and devoid of longitudinal muscular fibers and peritoneum."

The interest in this case lies in the question as to whether or not this condition was a congenital deformity? The illustrations show very clearly the structures as found at the operation, and whether the pelvic inflammation was responsible for the reduction in caliber of this structure connecting sigmoid and rectum.

My reasons for believing it to be a congenital defect, and not a part of the sigmoid compressed by the exudate of a salpingitis and pelvic peritonitis, are as follows:

1. The history of life-long constipation and necessity for taking cathartics.
2. The tube does not come from the sigmoid at its end, nor does it enter the top of the rectum.
3. The ballooning of both the sigmoid and rectum shows a process which must have antedated the pelvic inflammation.
4. The walls of this tube do not correspond to those of a compressed tube; that is, they are not thrown into folds and by no kind of incision, on or around the tube, could its caliber be increased to that of normal bowel.

Searching the literature on the subject of congenital malformations of the large bowel, I find cases as above reported to be very rare. The Index Medicus and the Surgeon General's Index contain no reference to anything like my case. Bergman ("System of Practical Surgery") says: Any portion of the intestine may be absent or its lumen may be wanting. This is especially true of the anus or rectum. Gärtner who, in 1883, collected reports of sixty-five

cases, exclusive of rectal affections, found that the most common seat of atresia is in the neighborhood of the attachment of the vitello-intestinal duct. . . . The large intestine is seldom the seat of congenital stenosis. Sometimes the sigmoid flexure is found bent at such a sharp angle as to interfere with the passage of feces. This produces secondary hypertrophy and dilatation. Johnson ("Operative Therapeutics") says: There are many instances where the sigmoid flexure becomes adherent to the Fallopian tube. On account of the proximity of the female generative organs to the sigmoid and the frequent inflammation resulting from infection of these organs, adhesions are very apt to occur between these structures.

After devoting much time and study to this case, I have arrived at the conclusion that this woman had a very rare congenital malformation of the sigmoid flexure and a very common affection of her tubes.

208 WASHINGTON BOULEVARD.

DISCUSSION.

DR. JAMES E. DAVIS, Detroit, Michigan.—In a recent study of 285 specimens from dissecting material at the laboratory of the University of Michigan, I found two diverticulæ of the descending colon.

DR. JULIUS H. JACOBSON, Toledo, Ohio.—Some years ago I had a similar case which was very interesting, and which led me to look up this subject. In my case the diverticulum was attached to the sigmoid, and ended blindly in the sacral region.

On looking up the subject I found that these diverticulæ were oftentimes remains of the neuroenteric canal, an embryological point which is often overlooked in a consideration of the etiology of diverticulitis of the sigmoid. Very early in fetal life there is a communication between the primitive gut and the spinal column known as the neuroenteric canal. The persistence of this small duct is the cause of many diverticulæ of the sigmoid and rectum.

SOME OBSERVATIONS UPON POSTOPERATIVE
URETERAL FISTULÆ.*

BY

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THE ureters are apt to be injured in any operation upon tissues in close proximity to the ureter, and in conditions that cause abnormal relations of the ureter to the surrounding structures. Growths that are impacted in the pelvis, that grow between the layers of the broad ligament, are apt to be associated with ureteral lesion in their removal. In these the ureter is often abnormally placed and, unless it is definitely located and identified, the likelihood of its injury is great.

In the enucleation of inflammatory pelvic masses, especially when the dissection is done from the pelvic side, the ureter is in great danger. The peritoneum may be so intimately connected with the inflammatory mass that it will adhere to it, and thus be torn away from the lateral wall of the pelvis. As the ureter goes with the peritoneum, it is in imminent danger of being severed or ligated.

I think that the greatest number of ligated and severed ureters are in hysterectomies for uterine fibroid. I have seen a number of these after operation and postmortem. Usually fistulæ do not occur unless in the operation the cervix is removed. In the supravaginal cases, should a fistula form, it is of the abdominal type, though a uretero-cervico-vaginal fistula is possible.

Since the extensive operation for carcinoma of the uterus has come into more general use, there have been more and more uretero-vaginal fistulæ. In this operation, the injury to the ureter is not due to ligating or cutting, for in it a deliberate and careful freeing of the ureter is done, but follow a necrosis of the ureteral wall, that may come from a temporary clamping of the ureter when endeavoring to stop active hemorrhage, or too much freeing and rough handling of the ureter. The blood supply of the ureter is generous, receiving, as it does, branches from the renal, the aorta, the iliacs, the ovarian, uterine, etc. These form so free an anasto-

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mosis, that the ureter may be freed, if gently done, from the kidney to the bladder and still have an adequate blood supply.

Sampson states that prolonged ligation of the ureter is less dangerous than temporary clamping, especially when the ligature material is catgut. This statement is borne out by clinical experience; for often ureters, that have been ligated for several days, will functionate properly after removal of the ligature. Recently, I had a case where the ureter was clamped for less than five minutes; when the clamp was removed the ureter was quite flat, but in the course of fifteen minutes it appeared normal. On the tenth day after operation, this patient developed an incomplete fistula on that side.

One should be particularly careful in attempts to control bleeding in the pelvis, unless he knows just where the ureter is. When bleeding occurs it can be controlled by finger pressure of the common iliac by an assistant until the bleeding point can be found and ligated.

Vaginal hysterectomies are attended with their share of ureteral injuries, especially when the operation is difficult and there is much hemorrhage that requires clamp control.

The result of injuries to the ureter naturally depends upon the manner of their infliction. If a ureter is ligated, the ureter may be permanently occluded, and the kidney cease to functionate with little, if any, disturbance to the patient. If plain catgut is used, I think it is absorbed and the ureteral flow established. I feel sure that a great many ureters have been ligated and never suspected. For this reason, it is wise to investigate the urinary tract after every difficult operation where there was a likelihood of a ureteral injury; particularly if another abdominal operation has to be performed in which a ureter may be injured. If the ureter is ligated with silk, the chances are that it will become permanently occluded, or a fistula develop when the silk cuts through the ureteral wall.

If the ureter is simply cut the urine drains from it, either into the cellular tissue or into the vagina if it has been opened. Sampson, in his experiments on dogs, drained the ureter into the abdominal cavity, and found that the ureters became occluded and that the dogs had not materially suffered. When the urine drains into the cellular tissue it may form a small pocket and the ureter become occluded, or great extravasation and extensive necrosis occur.

Most fistulae result from necrosis of the ureter, due to too rough handling, too extensive dissection, or temporary clamping. This type, as a rule, does not make its appearance until eight to fourteen days have elapsed. It is usually of the ureterovaginal type, but if

the vagina has not been opened, or has been securely closed, it may appear in the abdominal wound. The abdominal type of ureteral fistula may occur as a result of an unsuccessful uretero-vesical anastomosis.

In all of these ureteral fistulæ, there is a marked inflammatory infiltration around the end of the ureter, and this is to be remembered in operating. In the beginning it is so great that the repair of the abdominal fistula by another anastomosis has little show of success.

Diagnosis.—In uretero-vaginal fistula, if only one-sided, and there is a functionally good kidney on the other side draining into an intact bladder, there is constant leakage from the vagina, in addition to normally voided urine. This history is not pathognomonic, for there are instances of vesico-vaginal fistula with the same symptoms.

The time of occurrence depends upon whether the ureteral injury was due to ligation, necrosis from clamping, too free dissection, or severance of the ureter. It also depends upon whether or not free escape was present for the urine that drains from the ureter. Where the vagina is open and the injury was a severance, the leakage begins immediately after the operation. In the other instances it usually does not occur until after eight to fourteen days.

From the above symptoms a presumptive diagnosis of ureteral fistula can be established. Usually it is not necessary, or advisable, to thoroughly examine the patient just at the time of the occurrence of the fistula, but better to wait until the patient is up and about and stronger.

In the examination of the patient other things, than just the diagnosis of which side the fistula is on, are to be determined; for instance, the location of the injury, whether or not it is a complete fistula, the separate and combined functional values of the kidneys, whether infection has occurred and, in malignant cases, whether the bladder and pelvis are free of growth.

The bladder is filled with a solution of indigo-carmin or methylene blue, to determine if there is any leakage into the vagina. Should there be none, it is then washed out, and the bladder filled with boric acid solution. Ten cubic centimeters of a three-tenths of a 1 per cent. solution of indigo-carmin is injected intravenously, and the elimination from the two ureters then watched. If both excrete the dye, then an attempt to determine which eliminates the greater amount is made. Next, a catheter is passed into the suspected ureter; this usually meets with obstruction in the complete fistula of long duration; in some recent cases, where the vagina

is open, the catheter may pass into the vagina; in the incomplete there may or may not be obstruction. When the indigo-carminé is eliminated from both ureters and the passage of the catheter fails to show obstruction, it is necessary to inspect the vagina, after injecting indigo-carminé or phenolsulphonaphthalein intravenously. When the last is used the cotton pledgets must be soaked in an alkaline solution to bring out the red color. The patient is put in the knee-chest posture, a Sims' speculum inserted and the vagina inspected. Usually the fistulous opening cannot be detected. The vagina is plugged with pledgets of cotton, the patient made to sit up for five minutes, as in this position the drainage is better, and the pledgets removed. By noting carefully the location of the stained ones, the position of the fistulous opening can be located.

It should be mentioned that when the bladder is examined the occurrence of a supernumerary ureter should be carefully looked for. These are rather frequent and one or both ureters of the same side may be injured.

For a determination of the function of the kidneys, inject phenolsulphonaphthalein, collect the urine from the bladder, which represents the secretion of one kidney in complete fistulæ by catheter, and that from the vagina, which represents the excretion from the other, by having the patient sit over a vessel. In this way the combined and the separate functions are determined. Another way that offers as good results, except in the presence of alkaline or pussy urine, is to inject indigo-carminé intravenously and determine the time and intensity of the elimination from each kidney.

The Natural History of Fistulæ.—In the incomplete variety, especially when only a small spot on the ureteral wall has been injured, there is not so great likelihood of the ureter becoming obstructed, and for this reason the function of the kidney is not impaired. The majority of these close spontaneously within several weeks, though there are many exceptions. After the lapse of four months and no improvement, there is little hope of the fistula closing of itself.

In the complete variety, narrowing of the tract occurs, with consequent obstruction to the urinary flow. This causes back pressure, with consequent dilatation of the ureter, the renal pelvis and the calices, and pressure atrophy of the renal parenchyma. Usually there is added infection, which hastens the destruction of the kidney function. The amount of obstruction varies in a way with the distance from the bladder to the point of injury; when near, the tract is short, and the amount of obstruction is not so great as when

the injury is some distance from the vagina and the tract longer. In the uretero-abdominal fistulæ the tract is usually long, and the closure soon occludes the ureter and destroys the kidney. Spontaneous closure of the uretero-vaginal fistula occurs, occasionally, but not with the frequency that it does in the abdominal type.

Treatment.—This depends upon the nature of the injury and the condition of the kidneys. In the incomplete variety a waiting policy is advocated. If this does not avail, when possible, a ureteral catheter should be passed up the ureter past the point of injury, and left in for a few days. While this is in, the patient should take urotropin, and twice a day the catheter cleansed with boric-acid injections. Should the fistula still persist, it should be treated in the same manner as a complete fistula.

The vaginal plastic operation for uretero-vaginal fistula is not to be recommended. In this the ureter itself is not implanted into the bladder, but the end of the fistulous tract. The amount of contraction and effect upon the kidney occur as if it were not treated. If one felt sure that the ureter was divided just at the bladder, and could isolate the ureter and implant it into the bladder, then the operation would be justifiable; but seldom do such fortunate conditions exist.

To determine what to do rests upon the general condition of the patient, the condition of the kidney on the side of the fistula, and that of the one that is draining into the bladder.

After an operation for carcinoma, if there is any evidence of recurrence that cannot be treated and the disease is apt to progress rapidly, or that the patient is in a bad condition from any other cause, it is better to do nothing. If the kidney on the injured side is markedly damaged, and there is infection, nephrectomy is indicated. Under such circumstances, it is usually a minor operation, as the patient is not being deprived of a useful organ. In an attempt to do a uretero-vesical anastomosis we are subjecting her to a far greater risk, and even should the operation prove a success, the drainage of the infected urine into the bladder is deleterious.

In instances where there is little if any infection, and the functional damage to the kidney is not great, an abdomino-uretero-vesical anastomosis should be performed. This can be done either transperitoneally or extraperitoneally. The first is attended with more chance of securing a firm union between the bladder and the ureter, but with a greater risk, on account of peritonitis, from infection at the time of the operation, or leakage, should the union fail. Personally, I prefer the extraperitoneal operation. This should be done

with great care, for should we fail, we will have instead of a vesico-vaginal fistula, a uretero-abdominal fistula, which will probably necessitate a nephrectomy, as the success in a second uretero-vesical anastomosis is extremely poor. In this attempt we would have to deal with marked inflammatory infiltration around the end of the ureter and along the tract, as well as with a ureter that had been shortened to such a degree that the junction between it and the bladder may be hopeless. The same applies to uretero-abdominal fistula following other operations.

In regard to the time at which these operations should be done, in the incomplete variety, I believe it is well to wait three months if there is no infection, the ureter not obstructed, and the function remains good. As soon as it shows beginning damage we should not wait further in the hope that it will close spontaneously. In the complete variety, I think, the operation should be done as soon as the patient's condition permits and the inflammatory infiltration, that always surrounds the end of the ureter and the tract has diminished.

In the abdominal type spontaneous closure of the fistula is apt to occur within a relatively short time, but if this did not take place within two months, then the operation is indicated. This usually means nephrectomy.

On account of lack of time, the question of the proper treatment of injuries to the ureter, recognized when produced, has not been considered.

In Conclusion.—The proper care of ureteral fistulæ depends upon a knowledge of the natural history, a careful study of all the conditions, and selecting the treatment that is going to give good results. I think that we have been too conservative in attempting to save kidneys that are functionally of no value, and that in this so-called conservatism we have risked too much. It is useless and unwise to attempt a uretero-vesical anastomosis in the cases where there is serious renal damage. The operation is attended with more risk than a nephrectomy and, should success follow, the drainage into the bladder from an infected kidney is of itself harmful.

REPORT OF FIVE CASES OF URETERAL FISTULA.

CASE I.—This patient was operated upon February 9, 1909, and had a vaginal hysterectomy for carcinoma of the body of the uterus. During the operation there was much bleeding and clamps were put on to control it. No urine was excreted through the bladder for three days. On the third day drainage was noticed of urine through the vagina. Two days later she was examined cysto-

scopically and the left ureter could be catheterized one-quarter of an inch, and the right only 1 inch. There was no evidence of drainage of urine into the bladder, nor was there any evidence of leakage from the bladder into the vagina, as shown by the failure of indigo-carmin solution to escape from the bladder into the vagina. Four weeks after the first operation the patient had both ureters implanted into the bladder by the abdominal route, this having been done transperitoneally. At the time of operation the ureters were found about the size of the little finger and much indurated. The operation was very difficult, and took about three hours. Following the operation the patient developed pneumonia, and in coughing opened the wound upon the eighth day, the intestines escaping upon the abdomen. These were replaced, the abdominal wall resutured, and the patient made an uninterrupted recovery. This patient was under observation for a period of four months. When examined within a few weeks after the first operation the ureters were seen projecting into the bladder about one-half or three-quarters of an inch. This projection finally became smaller and when last seen projected only about one-eighth of an inch into the vagina. The urine that was discharged into the vagina was pus free and was seen coming from both ureters. In this case the point of note is the thickness of the ureters as observed a short time after the primary operation.

CASE II.—Mrs. S. N., sixty-five years old. In December, 1907, she had an abdominal panhysterectomy for carcinoma of the uterus. About eight days after the operation it was noticed that urine was escaping from the vagina into the bed. I saw her shortly after this and at the time I was unable to catheterize the left ureter more than one-quarter of an inch. The right ureter was easily catheterized, and urine was obtained from it. The diagnosis of uretero-vaginal fistula was made. She then refused to have any operation. I did not see her again until August, 1908, when I did a plastic operation through the vagina. In this operation I anastomosed the ureteral fistulous opening into the bladder. From this time on there was no escape of urine into the vagina. She was very comfortable until February, 1911, when she began to complain of much bladder irritability, and noticed that there was a large amount of pus sediment in the urine. When I examined her in March I found that the fistulous opening that I had anastomosed into the bladder was about the size of a match stick, and from it was seen coming a large amount of pus. On March 25, 1911, I removed her left kidney. It was about one-third the normal size, the calices were much dilated, and there was great atrophy of the renal parenchyma. The ureter was the size of a lead pencil, dilated and thickened.

This case teaches several interesting points. *First*, she should have been operated upon very soon after the occurrence of the injury to the ureter, and the ureter should have been implanted into the bladder by an abdominal operation. *Second*, the operation that I did was not an anastomosis of the ureter into the bladder

but an anastomosis of the end of the fistulous tract into the bladder, which was a mistake. *Third*, when I saw her and did the third operation it should not have been an anastomosis of the ureteral tract into the bladder, but should have been at that time a nephrectomy, as the kidney was at that time practically functionally inactive. *Fourth*, the kidney that was removed in March, 1911, shows the effects of the obstruction that comes from contraction of the fistulous opening.

CASE III.—Mrs. E. R. This patient was operated upon on Feb. 5, 1915, and had a hysterectomy for uterine fibroids. This was exceedingly difficult. Immediately following operation patient began to complain of pain in the right lumbar region. On Feb. 15, she noticed her bed was wet and from this time on there was a continual discharge of urine from the vagina. I saw her first April 1, 1915. At that time there was a continual leakage of urine through the vagina. She was given indigo-carmin intravenously and then a cystoscopy done. This dye was eliminated from the left ureter in four minutes in strong amount, but did not appear in the urine from the vagina until fifteen minutes had elapsed, and the color was faint. The patient was then put in the knee-chest position, Sims' speculum introduced, and the vaginal vault inspected. In the upper portion of the vaginal vault was a small ulcerating area that represented the unhealed portion of the vagina. Pledgets of cotton were put in and allowed to remain awhile, and then the blue portions stained by the indigo-carmin showed the point from which the urine was escaping. This was a small opening in the middle of the granulating area and situated toward the right side. Owing to the diminished kidney function, as shown by the indigo-carmin, the right kidney was removed rather than an attempt being made to anastomose the ureter into the vagina. The removed kidney showed evidence of marked pyelonephritis with dilatation of the ureter and dilatation of the calices. It is doubtful, had a ureteral anastomosis into the bladder been done in this instance, if the kidney would have resumed its function.

CASE IV.—January 15, 1913, this patient had a complete hysterectomy done for fibroids. Eight days after the operation she noticed a continuous discharge of urine through the vagina. When I saw her on the 20th of March, 1913, a continuous discharge of urine through the vagina was observed. She was given indigo-carmin and the elimination was noted from the two ureters, also the vagina. Both ureters were catheterized and the ureteral catheter on the right side met an obstruction of 2 inches from the vesical orifice. The patient was then put in the knee-chest posture, pledgets put in the vagina and after a time, when they became stained blue, it was seen that there was an injury on the right side of the vagina. When it was observed that both ureters were eliminating indigo-carmin, that there was an escape of blue-stained urine from the vagina, and no third ureter could be discovered emptying into the bladder, a diagnosis of lateral injury of the ureter was made. The determination that it was on the right side followed

the discovery of obstruction to the ureter catheter on that side and the fact that the blue-stained urine came from the right side of the vault of the vagina. On March 25, 1913, a transperitoneal ureterovesical anastomosis was made. Unfortunately, this patient died three days later from general pelvic peritonitis. The point of interest in this case, as in another that I have recently observed, is that the kidney function was well preserved after several weeks. This is particularly to be noted in those cases in which the injury to the ureter is a lateral injury and not one where the ureter has been completely divided. In those instances in which the ureter has been completely divided, the contraction of the fistulous orifice causes dilatation of the ureter and the renal pelvis with diminution of the kidney function.

CASE V.—This patient had an abdominal hysterectomy for carcinoma and seven days after operation her urine was discharged from the abdominal wound. I saw her three weeks after operation and at this time the amount of discharge was slight. She was given indigo-carmin intravenously and it was found that there was prompt elimination from the right ureter, but none was seen coming from the left ureter. After fifteen minutes, a slight bluish tinge to the urine coming through the abdominal wound was seen. A week after this the discharge from the abdominal wound had ceased entirely, and there was no discharge of urine into the bladder from the left side. This case illustrates the fact that in the uretero-abdominal fistulas the contraction of the long fistulous tract becomes complete and the kidney becomes inactive from the occlusion of the ureter. The patient has been lost sight of and I do not know the subsequent history.

CASE VI.—Mrs. G. This patient was seen first the 25th of May, 1915. She stated that she was forty-three years old, that she was the mother of several children, the last being born six years before. Since November, 1914, she has been troubled with an irregular, bloody, discharge from the vagina. Previous to that menstruation was irregular, but since November the discharge has been more or less constant. She has had no pain at all.

Examination shows a large cauliflower mass in the vault of the vagina, which was at the time considered inoperable. The abdomen was opened and the Percy operation was done on June 3, 1915. Following this the greater portion of the mass sloughed away, and upon inspection of the vagina the first of August there was no carcinomatous tissue to be seen through the vagina at all.

On August 5, a radical hysterectomy was done. In making the dissection from the bladder the vagina was torn into and a small carcinomatous mass was here found. It is possible that some of this was left at the time of the operation. Both ureters were freed from the bladder for a distance of $2\frac{1}{2}$ inches toward the kidney. In controlling the bleeding on the left side the ureter was clamped for five minutes. On removing the clamp the ureter was quite flat, but regained its shape and appeared normal after ten minutes had elapsed.

The patient made an uneventful recovery, except on the eighth day her urine began to escape from the vagina. In addition to this, the patient voided urine normally. When the patient was up and about indigo-carmin was injected intravenously and appeared from the right ureter in seven minutes, but none was noticed from the left. The left ureter showed no contract, and a catheter inserted into the left ureter met with an obstruction 3 inches from the vesical orifice. This discharge kept up continuously, except from Sept. 1 to Sept. 8 there was no leakage of urine. When she was examined on Sept. 10, there was a leakage from the vagina, and absolutely none from the left ureter into the bladder. Inspection of the vaginal vault showed a small granulation mass that may be just the granulation tissue of the drainage tract through the vagina.

During the patient's convalescence there was absolutely no pain in the region of the left kidney that indicated that the ureter had been tied during the operation. I believe that this fistula was due to necrosis of the ureter, caused by clamping of the ureter.

With this patient, I shall remove a portion of the granulating mass in the vault of the vagina, and have this examined to determine if it is malignant. If the patient's condition is good and there is no recurrence, then I shall undertake the repair of the fistula by the abdominal extraperitoneal route.

FORTY-FIVE EAST SIXTY-SECOND STREET.

DISCUSSION.

DR. FRANCIS REDER, St. Louis, Missouri.—Dr. Furniss did not give us a very encouraging picture relative to a fistulous condition of the ureters. In the first place, he almost condemned any effort that might be made through the vagina in order to correct this condition. In the second place, he tells us that with a failure through the abdominal wall we create a condition worse than we probably had at first.

I had the misfortune only about seven weeks ago, after performing a simple hysterectomy for hemorrhagic uterus, to find, after making my final inspection of the patient preparatory to sending her home, that she had a watery discharge in her vagina. I detained her several days to determine what this moisture was. There were no vesical conditions that would lead to any suspicion that the bladder had been injured. In order to confirm this I injected some milk into the bladder, but I found no discoloration of the watery secretion that was found in the vagina. The conclusion was that the ureter had been injured. It was a most distressing time for me, for, as usually happens, this patient was somebody in the community, and her physician had assured her of a complete cure. I questioned the nurse in a roundabout manner if she had suspicioned something, and she said she did not, which was gratifying to me. I sent the patient home and requested her to report to me occasionally in regard to the peculiar discharge which I called a serous discharge from the vagina. I was very happy one morning to receive a letter from her telling me the discharge had ceased.

When Dr. Furniss read his paper I was desirous to know from him at what time he had found it advisable to attack a ureteral fistula. This is an important question, for it is necessary that sufficient time should be given the fistula for a spontaneous closure.

DR. K. I. SANES, Pittsburgh, Pa.—I had a rather unique experience some ten years ago in a case of vaginal hysterectomy. A blade of one of the hysterectomy forceps broke and the parametrium was then carefully caught with another forceps. Everything looked well until seven days after operation when an uretero-vaginal fistula was discovered. During an attempt to find this fistulous opening with a ureteral catheter, the catheter entered the uterine artery and a severe hemorrhage followed. With a hemostat the bleeding was arrested and an abdominal uretero-cystotomy was then performed. The patient made an uneventful recovery. This experience shows the danger of trying to find the opening of the ureter with a ureteral catheter through the uretero-vaginal fistulous tract on account of the liability to get into the uterine artery instead of the ureter.

DR. FURNISS (closing the discussion).—One of the points I tried to bring out was the difficulty of seeing the ureteral orifices by inspection of the vagina. We never attempt to do it until we give indigo-carmin intravenously so that it will stain the urine. By plugging the vagina with cotton, and gradually taking it out, we can spot it in that way.

I had my first misfortune about a month ago when I clamped the ureter for five minutes and ten days later I got a fistula. After removing the clamp the ureter appeared normal.

MESENTERIC THROMBOSES. REPORT OF TWO CASES.*

BY

WM. EDGAR DARNALL, A. M., M. D., F. A. C. S.,
Atlantic City, N. J.

ALTHOUGH mesenteric thrombosis has been known to the profession since its discovery by Virchow in 1847, the clinical picture of it received little attention until the very thorough article by Litten in 1875. Virchow's investigations were made at autopsies and largely from the viewpoint of the pathologist. More recent studies have been attempted by several workers, the most important perhaps being the monograph of Jackson, Porter and Quinby. They collected all the cases up to a few years ago amounting to 214. Since that time a few cases have been reported. While the condition is perhaps commoner than was at first supposed, it is still rare enough for each case to be of some interest.

Not much attention has been given to mesenteric thrombosis by the authors of treatises on surgery and the matter is either not mentioned at all or dismissed with a few words, attributing the cause of the condition to some disease of the heart or liver or arterial system, while DaCosta says it is usually associated with endocarditis.

I believe that infection plays a decidedly more important part in the etiology than we have thought in the past. Recent studies go to show what a tremendous element infection is in all the ordinary types of embolism and thrombosis, such as occur in the saphenous and pelvic veins, the lateral sinus, the uterine sinuses, and other parts of the anatomy. It is only reasonable to infer, therefore, that the cases of acute mesenteric thrombosis are the result largely of some focus of infection, such as appendicitis, gall-bladder infections, ulcerations of the intestine or even from metastasis from a distant focus of infection.

In the cases of slow onset it is no doubt true that atheroma, or heart or liver disease, by gradually obstructing the vessels and slowing the blood current, produces a condition resulting in thrombosis.

The superior mesenteric artery is most often the seat of trouble. This artery through its branches, the inferior pancreatico-duodenal, the middle colic, the ileocolic and the terminal branches to the cecum and the appendix, supplies no less than 25 feet of intestine

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and affords the only blood supply to that region. The inferior mesenteric supplies only the descending colon. As was shown by Litten's experiments, the superior mesenteric is practically an end artery and is the one commonly affected. Thrombosis of the inferior mesenteric is very rare because of the fact that it possesses anastomosing branches with the celiac, but the superior mesenteric has no such anastomoses.

Weil differentiates between ascending and descending thrombosis of the mesenteric veins. In the ascending type the main trunk of the portal vein is not involved, the process taking its origin in the radicles of one region. In the descending type the portal trunk becomes thrombosed first and symptoms of portal stasis dominate the whole clinical picture. The diagnosis is seldom made and the mortality is extremely high, about 94 per cent.

The symptoms are acute and come on suddenly. The pains are excruciating. Some cases resemble intestinal obstruction and are usually diagnosed as such. Some resemble acute general peritonitis.

The cases can be divided into two groups, acute and chronic. The first group is by far the larger and is composed of cases sudden in onset, and colicky abdominal pain often at a time when the patient is in apparently full health. This is followed by nausea, vomiting and a diarrhea which may be bloody; or the picture may be one of obstinate intestinal obstruction of the paralytic type. Often not even flatus is passed. In many cases the temperature falls below normal. The abdomen rapidly becomes distended with gas, peristalsis is absent, and death occurs in a few hours or days. The second group consists of chronic cases insidious in onset with, sometimes, remitting symptoms; these cases have no symptoms referable to the abdomen during life; and, in a few of them, spontaneous cure has occurred.

The two cases reported herewith represent, one the acute peritonitic type, and the other the paralytic obstructive type.

CASE I.—Miss A. N., aet. seventeen, weight 148, well developed, referred by Dr. Halvor Harley of Pleasantville. No children, one miscarriage. She is the victim of purulent leucorrhea, headaches and backaches. Menses began at the age of thirteen, at intervals of two weeks; flow profuse and painful; appetite and digestion good; bowels constipated. Examination reveals a fixed uterus, double pyosalpinx with infected ovaries. Abdomen is very much distended with gas, and tender over McBurney's point. There has been no bowel movement in the last three days. Temperature 103° F., pulse 120. *Diagnosis:* Ruptured appendiceal abscess. Immediate oper-

ation confirmed the diagnosis. Beside the perforated gangrenous appendix, we found small bands of adhesions blocking the terminal ileum and 59 inches of gangrenous small intestine. The appendix and all of the gangrenous intestines were removed. Patient died of shock in three hours.

CASE II.—Miss B. referred by Dr. W. E. Jonah, with a diagnosis of intestinal obstruction. Hairdresser by trade, aet. thirty-five, thin, anemic. Appendix had been removed previously. Temperature 102° F. pulse 130. Severe obstipation but not much abdominal distention. Immediate operation revealed a volvulus of the small intestine matted over by omentum and transverse colon. Under the mass a collection of 3 or 4 ounces of pus was found. The ascending and transverse colon were gangrenous, and the peritoneum much thickened. After relieving the volvulus, which was not complete, the ascending and transverse colon were resected. They were so friable that, in picking them up between the fingers, the finger tips would sink into the lumen of the bowel allowing the fecal matter and dark coagulated blood to escape. The entire abdominal cavity became soiled with the escaping intestinal contents. Patient was in a serious condition after the operation, lived nearly a week, and died of septicemia.

Neither of these cases had bloody stools and both of them presented the symptoms of the condition for which they were operated, namely: Appendiceal abscess in the first case and partial intestinal obstruction in the second. The thrombosis in each case was a complication of the existing conditions and secondary to them. In each case the thrombosis was, undoubtedly, due to a focus of infection.

The affected segment of gut may vary from a small portion of the bowel to the whole length of the intestine. One of the cases herewith reported showed an involvement of 59 inches of gangrenous gut. The largest extent of affected gut that I have been able to find recorded in literature is Dr. Elliott's case in which he removed 48 inches of bowel with the happy result of complete recovery of the patient.

The gut, under these circumstances, is of a dark chocolate color, swollen, edematous and soon becomes gangrenous. It is usually filled with old dark, more or less, clotted blood mixed with feces. In the abdomen will usually be found a bloody fluid similar to that seen in the sac of a strangulated hernia. The most hopeful cases are those in which small areas of bowel are involved and in which an early operation is done.

Any other than surgical treatment need not be considered. It is generally agreed that resection of the involved gut is best for the patient; however many cases have been lost which, possibly, might

have been saved if anastomosis had been delayed and performed later in a secondary operation. The reason for this is that one cannot be certain that the gangrene has reached its limit and may not extend farther, and that a primary, radical operation consumes more time and inflicts more trauma than the patient can stand. These patients are, usually, in bad condition when they are brought to us for operation. According to Jackson it is, therefore, better that the gangrenous portion of the gut should be brought well out of the incision leaving full liberal margins at both ends. The gut should be resected and the ends of the same sewed into the wound, which is well walled off with gauze. With both ends of the intestine thus open, distention may be relieved and signs of further extension of the gangrenous process watched. At a later date, if the patient survives, the fistula may be closed and an anastomosis done.

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1704 PACIFIC AVENUE.

DISCUSSION.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—The condition reported by the essayist is not as rare as the literature would lead us to believe. I have found it in several cases after appendicitis operations. I believe it is one of the causes of death after appendicitis operation, and it is more frequent than we have heretofore thought. The doctor's theory of infection being a cause is absolutely correct.

DR. DARNALL (closing).—I agree with you, Mr. President, that if we look for these cases more carefully, we will find them more frequently than we have in the past.

REMOVE THE UTERUS INSTEAD OF THE OVARIES FOR
INCURABLE CASES OF MENSTRUAL DISORDERS.*

BY

J. H. CARSTENS, M. D., F. A. C. S.,

Detroit, Mich.

WHEN Batty first advocated oophorectomy for incurable cases of dysmenorrhea, when Lawson Tait first recommended the removal of pus tubes, and Hegar proposed the extirpation of the uterine appendages for the various incurable disorders of the pelvic organs, the profession was very much opposed to any of these operations. The above three men, independently of each other, worked along the same lines, and published their conclusions and their work in 1873, within a few months of one another. Theirs were new propositions altogether. The large mortality of abdominal operations in those days and the views entertained concerning the sacredness of the sexual organs were so strong, that it took a good many years to convince medical men that the principle of these operations were well founded and perfectly proper. The just developing antiseptic surgery came to our aid and enabled us to show that these operative procedures were not very dangerous. Those of us who helped to make abdominal surgery, had a hard struggle. We were viciously abused in many ways. But we, notwithstanding, accomplished our object. We had to be very conservative and, therefore, only operated on the worst and most hopeless of cases. These cases, naturally, had a large mortality. This made our position all the more difficult; but with increased experience, improvement in technic, and the development of *aseptic* surgery, the mortality gradually declined. Then the general surgeons invaded the field of gynecologists, and they, together with the young inexperienced *would-be surgeons*, began to remove the ovaries indiscriminately. Then we called a halt.

As our knowledge of internal secretions improved, we found that it was necessary to discriminate carefully in the selection of our cases. Conservation of an ovary or of some of the ovarian tissue, whenever possible, was now advocated, and practised sometimes to such an extreme extent, that the operation failed to cure the patient, and a second, and, sometimes third operation was necessary to re-

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lieve the patient. I well remember calling attention to the fact, and stating that a mere remnant of the ovary was not worth saving; that I have had a number of cases of ovarian tumors, and other conditions, develop in portions of ovarian tissue left because of the importance attached to it and which later required a secondary operation to bring about a cure. I also stated that in many cases it was not worth while to save an ovary, or part of it, that menstruation might continue and, that, indeed, in many of these cases it was our object to establish the menopause for the purpose of relieving the patient. These views, I think, are still good.

However, in due time, the profession arrived at the conclusion, that in young women healthy ovaries should be preserved; in women above forty more radical procedures were admissible. Still, in the course of time, we found that women around forty did suffer more during the menopause than younger women. I then began to do abdominal and vaginal hysterectomies for the relief in these cases, and leaving in, at least, one ovary. I soon discovered that the women so treated got along well. They never had any symptoms at all. In fact they never knew that even the uterus was removed unless they were told. This made me more courageous and I operated in this way in all these cases, leaving an ovary, or part of one, in every instance. I make it a rule to inform the patient beforehand that I am going to leave some of the ovarian tissue, and should they ever, have trouble with it a second operation will have to be done.

I remove the uterus and ovaries completely only in cases of nervous disturbances such as insanity, epilepsy, hystero-epilepsy, and in all cases where it is desirable to prevent pregnancy and when it is evident that a *cure can only be made complete by establishing the menopause*. The latter cases are rare. We have ceased to operate for the cure of epilepsy.

Obtaining such splendid and immediate results in cases requiring hysterectomy from any cause, by permitting one or both ovaries to remain, I have been induced to substitute hysterectomy for oophorectomy in cases calling for the establishment of the menopause, to bring about a cure. Permit me to cite two cases:

Miss O. K., aged twenty-three, very anemic; hemoglobin 40 per cent. She had been menstruating excessively for years, and had been curretted four or five times, when she came to consult me. At this time she had been bleeding from the uterus for three months, continuously. I suggested another thorough curetting, and experienced some difficulty in persuading her to submit to it, as the previous operations had given her no relief. However, she agreed, and I curetted her August 21, 1910. Microscopic examination of

what was removed from the uterus showed adenocarcinoma. Five days later I performed a hysterectomy without removal of the ovaries. She made an uneventful recovery. She is now the picture of health, and able to make her living.

Mrs. J. S., aet. twenty-five, sister of the first case. She had been bleeding from the womb for three months when she came to me and stated that she had been curetted three times with only temporary benefit. She had never been pregnant. I advised another curetment but she refused because the other operations had only slightly relieved her. I persuaded her, however, stating I would have to make a microscopic examination of what would be removed from the uterus. At the operation, February 10, 1915, I removed every particle of the uterine mucosa, and thoroughly swabbed the cavity with pure nitric acid, firmly believing this and was sure that would cure the patient. She gained in weight, strength and color. Microscopic examination of the scrapings showed diffuse polypoid endometritis. The third menstruation following the curetment, was rather prolonged; the fourth never ceased. She returned and insisted upon the removal of the uterus. I hesitated, and applied nitric acid every third day for a month but of no avail. Finally I decided to make a vaginal hysterectomy, but to leave the ovaries. This was done July 13. She made an excellent recovery, is now the picture of health, and very grateful for what I did for her.

These patients belonged to a family of bleeders. The mother and an aunt bled very profusely when menstruating. There have been in the two cases reported, no symptoms characteristic of the sudden menopause.

Heretofore, it has been a general rule with the profession, in cases of severe dysmenorrhea, or any other condition which incapacitates women from working during the menstrual period, to advise removal of the ovaries. My experience has taught me that it is much better in these pitiable cases to remove the uterus and leave one or both ovaries. These women recover rapidly from the operation and enjoy perfect health in a very short time.

CONCLUSIONS.

First.—All cases that require the establishment of the menopause, should be subjected to hysterectomy, leaving the ovaries.

Second.—Vaginal hysterectomy is preferable, but if there are indications of extensive adhesions or perhaps other abdominal complications, an abdominal hysterectomy, leaving one or both ovaries, is preferable.

1447 DAVID WHITNEY BUILDING.

DISCUSSION.

DR. WILLIAM EDGAR DARNALL, Atlantic City, New Jersey,—I would like to ask Dr. Carstens a question. Do these patients have

any trouble at the menstrual periods with congestive symptoms, and when he does a supravaginal hysterectomy does he leave enough of the uterus for the patient to menstruate from and do they menstruate regularly?

DR. WILLIAM H. HUMISTON, Cleveland, Ohio.—It is with a feeling of timidity that I arise to disagree with my friend, Dr. Carstens. He is much more able in the use of forcible English than most of our fellows and I feel a handicap in starting out. He has reported two cases of hemorrhage and dysmenorrhea cured by hysterectomy, leaving the ovaries intact. I can readily understand that removal of the uterus will stop menorrhagia, but it will not relieve her pain if she has diseased ovaries. On the other hand, Dr. Carstens has been proclaiming for years the success he has obtained with the use of the stem pessary for the cure of dysmenorrhea—that a stem pessary will cure all of these cases.

DR. CARSTENS.—That is right.

DR. HUMISTON.—I believe Dr. Carstens is right only in a certain per cent. of his cases. If he makes a hysterectomy for intractable menorrhagia with normal ovaries, he will succeed. If the ovaries are diseased the patient will continue to suffer unless oophorectomy is done. Many patients are made worse by the simple operation of curetment. For unless a discriminating diagnosis is made, curetment alone is not sufficient to afford relief. Dysmenorrhea for years—until there is constant pain in both ovarian regions—means a structural disease in the ovaries with all the stubborn reflex nervous disturbances that plague these patients constantly. An experienced surgeon will find on bimanual examination an ante-flexed uterus with cirrhotic ovaries—ovaries smaller than normal, corrugated surface hard as ivory. Hysterectomy leaving the ovaries will not cure this case, nor will a stem pessary. Thorough dilatation of the uterine canal and oophorectomy is indicated.

A finer discriminating diagnosis is required in all stubborn pelvic complaints, or failure to relieve will be frequent. There will always be a demand for the well-trained gynecologist, as the general surgeon will fail in benefiting a large majority of these long-standing intractable cases of pelvic disease.

DR. RUFUS B. HALL, Cincinnati, Ohio.—I would like to ask Dr. Carstens to tell us if he has made any of these operations, leaving the cervix, doing a supravaginal hysterectomy for instance, and if so, when the menstrual period arrives, is there any undue suffering or pain and any bleeding from the cervical stump that is left? It is possible that the very cases the last speaker mentioned would be relieved. It is probable that if ovaries remain, even though they are diseased and the uterus is removed, the woman would be better off than if her ovaries and uterus were removed. We all know from past experience in doing hysterectomies that gradually we began to save an ovary occasionally, and then later on we were saving more and more, and this was a great advantage to the patient physically, mentally, bodily and in every way if we could leave a piece of an ovary.

The cases mentioned by the last speaker we are all familiar with. We have been through it. We relieve some of the symptoms, but make these patients worse in some other respects, but we do not know what else to do. As I have said, this subject opens up a way to relieve women physically, although they cannot bear children, but if they are well physically after this method of treatment I for one will hail it with delight.

DR. HUGO O. PANTZER, Indianapolis, Indiana.—The case which I would regard as being suited for this measure is that having an exquisitely tender endometrium, where the introduction of the sound gives rise to great pain. Painstaking care in seeking the differential cause of dysmenorrhea in each case and meeting this cause remedially, here as elsewhere, will achieve good. The procedure here advocated is not entirely new. Some Vienna author recently reported the similar procedure, removing also the greater part of the uterine mucosa. The results reported by him were satisfactory, and many cases had some flow regularly at the menstrual periods afterward. The quantity was variable, but some flow appeared at every menstrual period.

One allusion in the paper suggests another point. While the removal of the ovaries for the cure of epilepsy is now and generally speaking should be tabooed, I have had an interesting late report on such a case. The patient had only three attacks within the first year following the operation, and no more since.

However, to offset this benefit, her previously happy marriage had recently suffered disturbance. The patient's sexual apathy and revulsion is now threatening the dissolution of the marriage. The case is mentioned here as having a philosophic interest, both as to how the double oophorectomy relieved the epilepsy, and as emphasizing the far-reaching "social" effect of an unsexing operation.

DR. ABRAHAM J. RONGY, New York City.—In the treatment of cases of dysmenorrhea of the type referred to in Dr. Carstens' paper, I think it is better to remove the uterus than the ovaries for the uterus has no internal secretion, while the ovaries have, and if you retain the ovaries you retain this secretion. By removal of the uterus practically no internal secretion is lost. If the uterus or the ovaries are to be sacrificed I believe it is better to remove the uterus.

DR. CARSTENS (closing).—I have talked to you gentlemen about the use of the stem pessary until you must be sick, but you must remember that I always have talked about dysmenorrhea caused by disease of the uterus. I have never talked about a stem pessary curing any case of dysmenorrhea that is caused by a cirrhotic condition of the ovary or anything of that kind. I did not report any of these cases with cirrhotic ovaries, although I might have done so. When you have a cirrhotic ovary, you generally have one involved before the other is implicated, and in one case you remove the uterus, and you save the other ovary.

As to the case reported by Dr. Humiston of a poor, sick, maiden lady, do I know them? Certainly. These women often suffer for fifteen or twenty years from ungratified sexual desire. They have

got that fine mechanism and have never used it, and finally Nature rebels, and they are suffering and something has got to be done to relieve them. They should have been married and have children. They become incapacitated from their work, whether they are school teachers, stenographers, or something else, and you must bring on the menopause. The only question is, how are you going to do it? Some of these women have a discharge. They have an endometritis. They have been curetted; they have received local treatment by the month; the discharge does not stop, you may remove the ovaries, and still you do not cure the endometritis. They are still suffering from that. How much better is it to take away the uterus and stop the secretion and stop menstruation? Isn't that better? You then cure them all at once.

As far as abdominal hysterectomy is concerned, personally, I leave a little of the cervix. Sometimes where I operate for fibroid tumors on account of extensive adhesions and so on, I find it is better and safer and a quicker operation to leave a good long cervix. In these cases you may have menstruation afterward if you leave an ovary, and sometimes they have a leukorrheal discharge. In such cases, where I want to bring on the menopause, I take out the cervix and shell out the mucous membrane, so that none of it is left except a bit of stump of the uterus.

Again, we have cases of pus tubes, and these tubes may have ruptured or may have become inspissated or may have ruptured into the rectum. We have the results of adhesions, a pulling back of the uterus or displacement of the uterus causing dysmenorrhea. In these cases you can do a vaginal hysterectomy, remove the tube, and leave an ovary, and it is marvelous how well such a woman will feel after that operation. It is unnecessary for me to call your attention to this class of cases and how to deal with them, but my remarks have reference more particularly to the young tyro who comes out of our medical colleges, and when a woman comes to him, a young woman in particular, who has pain in the side, he thinks she has some trouble with the ovary. He attributes all the pain to the ovary, but it is not. You can have the worst kind of inflammation, the worst kind of pus tubes, and the worst kind of disease of the uterus, and you will find one or the other ovary is healthy. When you have those cases that require the establishment of the menopause, leave in one of these good healthy ovaries or leave in one-half of it, then you do not have to give ovarian extract and things of that kind. They will be well, and they will feel well, have no symptoms, and will never know they had an operation. I believe in taking out the miserable, rotten uterus.

ON THE USE OF SODIUM CITRATE FOR DIRECT BLOOD TRANSFUSION.*

BY

CHARLES B. SCHILDECKER, M. D., F. A. C. S.,

Pittsburgh, Pa.

(With one illustration.)

THE anticoagulant effect of sodium citrate on the blood is well known. Together with sodium fluoride and the soluble oxalates it offers the best means of retaining the blood *in vitro* in the fluid state. The citrate, however, unlike the fluoride and the oxalate, is without any toxic action on the animal economy in the proportions used.

In order to understand the anticoagulant effect of the citrate, it is well to mention here the currently accepted theory of blood coagulation (Morawitz). In the blood there is present an enzyme called thrombogen. This *thrombogen*, in the presence of *calcium*, is activated by an organic thromboplastic substance which is called *thrombokinase*. In this way the thrombogen is changed to thrombin. This thrombin attacks the fibrinogen and liberates the fibrin in the meshes of which the corpuscular elements are caught, and the blood clot is thus produced.

What the citrate does is to precipitate the soluble calcium salts of the blood, and the coagulation is thus stopped.

The use of sodium citrate for direct blood transfusion in human beings was suggested by Hustin of France in 1914. In the Argentine Republic a number of investigators have had success with this substance. Lately, in New York, Dr. Richard Lewisohn and Dr. Richard Weil have reported success by the use of sodium citrate in blood transfusion.

At first, we were afraid that the toxic effects of sodium citrate were such that it would not be advisable to use it. We are studying the effect of citrate-blood transfusion and shall report that subsequently. But we can here state that there is nothing to preclude the use of the sodium citrate for transfusion purposes.

In order to make transfusion a simple procedure easy of performance, an apparatus was devised of which the accompanying

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illustration is a photo. It is a glass stopped, graduated, cylindrical container with a side tube near the top. The bottom of the vessel is drawn to a tube about a quarter of an inch in diameter and bent at right angles. Accompanying this apparatus are two glass cannulæ, one male and one female, which fit *in* and *on*, respectively, the end of the container.

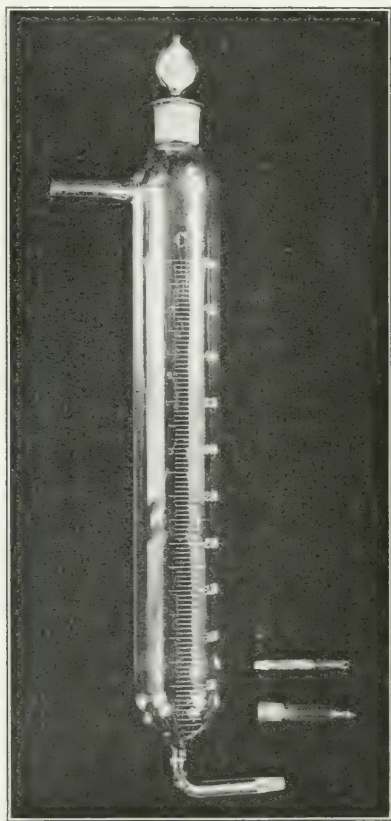


FIG. 1.

The method of performing the transfusion is as follows: Under all aseptic and antiseptic precautions, the *male* tube is inserted into the vein of the donor and the *female* tube into the vein of the recipient. The tubes are so made that they can be securely fastened in the veins. Bull-dog clamps can occlude the veins at any moment. The apparatus is now connected with the cannula in the arm of the donor. Five cubic centimeters of a 10 per cent. citrate solution

are put into the vessel; the blood is then allowed to run and gently stirring, with a glass rod is necessary to effect a good mixture of the blood with the citrate solution. The blood is allowed to run until the required quantity has been obtained. The clamp is now adjusted so that blood flow ceases. The thumb is placed on the side tube, the apparatus removed from the female tube and adjusted on the arm of the recipient. The blood is now allowed to run in. The whole procedure should not take more than ten minutes.

The advantages of this apparatus are: 1. The whole procedure is visible. 2. No hurry is necessary. 3. The exact quantity of blood taken can be measured. 4. It does not require much experience to use it. 5. It can be used in a private office or dwelling. 6. The operation is not an unsightly procedure.

PARK BUILDING.

DISCUSSION.

DR. MAX KAHN, Pittsburgh, Pa. (by invitation).—Transfusion is indicated in cases of marked secondary anemia due to infection, malignancy, disease of the hematopoietic system parasites, etc.; in cases of pernicious anemia, and in certain metabolic diseases. In many instances, cases to be operated upon have such a degree of secondary anemia that operative procedure is almost impossible. In such cases several transfusions should be made until the blood content is raised, and the operation then performed. It is to be understood that before doing any transfusion, strict examination should be made of the suitability of the blood of the donor—the Wassermann reaction should be made and the blood should be examined for isotonicity.

The advantage of this apparatus is the ease with which transfusion can be accomplished. We have observed in a number of instances that the blood rise following transfusion is step ladder in character. By that I mean that after the transfusion the blood content will fall after the initial rise, but this fall does not reach the low level that it was previous to the transfusion. In order, therefore, to cause a blood content approximating normality, these transfusions should be repeated several times.

Sodium citrate as is well known has an anti-coagulant effect. It was at first thought dangerous to use this salt to prevent coagulation during transfusion, because of the toxic effect which certain authors have observed on the administration of this salt. We have observed no detrimental signs or symptoms that are caused by the little amount of this substance that is used during the transfusion. In order to transfuse 500 c.c. of blood it is necessary to use 5 c.c. of a 10 per cent. solution of sodium citrate. This makes the concentration of this substance in the transfused blood to be 0.2 per cent. It seems that the body oxidizes the citrate before it is excreted in the urine.

The ease and facility with which transfusion can be done by means of this apparatus are very striking, and are such as to recommend it to the general clinicians.

DR. JULIUS H. JACOBSON, Toledo, Ohio.—I have been very much interested in this subject of blood transfusion by this simple apparatus. For a long time I have practised arterio-venous anastomosis according to the method of Carrel and Crile. The method is often-times difficult and we meet with failures. In some cases the results are brilliant, in others they are not, owing to the difficulty in securing sufficient blood from the donors by direct transfusion. Lately we have been using the Kimpton-Brown tubes, and I think these tubes, when properly used, are most excellent. The method which the doctor describes seems to have advantages over the Kimpton-Brown tube.

I would like to ask two questions, first: whether the citrate solution can be used in connection with the Kimpton-Brown tube, and whether you use any paraffin on the end of the tube to prevent coagulation?

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—I will simply say in connection with this discussion that those who have been in the habit of using the Fischer solution which is a strong alkaline solution need have no fear of the small amount of citrate of sodium that is used in this method of preventing coagulation of blood.

DR. SCHILDECKER (closing the discussion).—In answer to Dr. Jacobson's first question, I would like to say that the use of sodium citrate obviates the necessity of using paraffin. Therefore, we do not use it. In answer to the second question, I do not know why this tube could not be used with the sodium citrate solution. From your description of it, I can see no reason why it should not. It is unnecessary to use air pressure in this apparatus for the reason that the cannulæ are all of large caliber, relatively speaking. You can always augment the flow by air pressure, but it is unnecessary.

NEWER CONCEPTIONS OF INTESTINAL STASIS.*

BY

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SIR ARBUTHNOT LANE has focussed attention on intestinal stasis by his bold and successful operation for its relief; and his procedures are now extensively on trial. The purpose of this paper, however, is not to discuss his conceptions, but to describe the mechanism by which the phenomena which accompany intestinal stasis are produced and to show how certain chronic diseases result from this condition.

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General depression, emaciation, progressive physical and mental weakness, loss of appetite, irregular respiration and pulse constitute the clinical picture which can be distinguished from the outwardly identical pictures of exhaustion, resulting from excessive emotion, exertion or infection, only by modern methods of diagnosis.

The identity of the clinical picture of intestinal stasis with the symptoms produced by chronic infections and by excessive exertion, led me to suspect that intestinal stasis might well be an etiological factor in certain diseases of which infection, excessive emotion and excessive exertion, are etiological factors—such as cardiovascular disease, exophthalmic goiter, diabetes, etc.

In an experimental research animals were given injections of indol and skatol, the typical products of intestinal stasis. Histological examination of the organs and tissues of these animals showed lesions in the brain, the adrenals and the liver, identical with the lesions in these organs produced by any stimulus of the kinetic system.

Chemical studies of the iodine content of the thyroid and of the glycogen content of the muscles and of the liver, gave further evidence of the increased activity of the kinetic organs in the presence of these products of intestinal stasis. In other words, after injections of indol and skatol, as after the application of other kinetic stimuli, increased functional activity of the organs of the kinetic system is evidenced, in the case of the brain, by the loss of Nissl substance; in the thyroid, by changes in the iodine content; in the liver, by histologic changes and by changes in the glycogen content; in the adrenals, by histologic changes and by increased functional activity as evidenced by the Cannon test; in the muscles, by progressive weakness and changes in the glycogen content.

The retention of feces in the intestines, therefore, produces a continuous abnormal activation of the kinetic system from which there result morphologic and histologic changes in the energy-transforming organs of the body. The sequel of this continuous activation will be the same as the result of the continuous application of any other stimulus—some organ in the kinetic chain, the weakest, will be modified or broken under the strain; or else all will be weakened and the premature "senility," defined by Metchnikoff as due to the absorption of intestinal poisons, will result. The weakening may be first manifested in the brain, from the depressed activity of which there will result a slowing down of the whole mechanism for the transformation of energy; or the liver may be unable to bear the strain and, its inability to break down the acid by-products of energy transformation, may cause structural changes

in the kidneys, causing Bright's disease or diabetes; or may act indirectly as one of the causes of cardiovascular disease; or the continuous stimulation may be first manifested by an increased activity of the thyroid gland, leading to an increased driving of the whole mechanism in Graves' disease.

As in every case of excessive kinetic activation, treatment must consist, first, in removing the local stimulus; and second, in repairing the damage sustained by other parts of the mechanism.

Nausea, indigestion, loss in weight, headache, loss in mental and physical power, especially when combined with local tenderness along the cecum and the ascending colon, suggest the diagnosis, which may be confirmed by x-ray findings. If the condition does not yield readily to other therapeutic measures, operation may be considered.

Since surgical trauma will drain still more the depleted stores of energy in the body, the operation is performed under complete anociation. An ample incision is made under complete local blocking with novocain. Nitrous oxid is the anesthetic of choice, although it may be necessary to add ether in order to secure complete relaxation during the development of the operative field, the ether then being omitted and the operation completed under nitrous oxid.

As soon as the abdominal wall is opened, a deep infiltration with quinin and urea hydrochlorid is made at a distance from the line of incision. As it requires from fifteen to twenty minutes for the quinin and urea hydrochlorid to become effective, novocain is depended upon to produce immediate anesthesia in the local field. Before the effects of the novocain have disappeared, the quinin and urea hydrochlorid will have become effective and the whole abdominal field will then remain anesthetized and relaxed throughout the operation and, indeed, for several days thereafter.

In a resection of the intestines the most important consideration is the proper planning of the scope of the operation. The ample incision gives the optimum opportunity for exploration and obviates the necessity for dragging the viscera out of the wound. In other words, it makes it possible for the operation to be taken to the intestines. The intestines need not be pulled out beyond the point at which definite traction on the mesentery is being made.

The only shock-producing factors in operations on the intestines are traction on the mesentery and traumatization of the peritoneum. Suturing, cutting, burning and even crushing the intestines, independently of other factors, cannot produce shock, because no nociceptors have been evolved against these types of trauma. Anocia-

tion in intestinal operations is simple enough; therefore, as it means merely that the surgeon must avoid dragging manipulations, packing with gauze, and heavy retraction of the abdominal wall, and that he must minimize bleeding, a small amount of which is inevitable.

My procedure of choice is resection of the cecum and ascending colon, making a lateral anastomosis between the ileum and the transverse colon near the hepatic flexure and buttressing the closed ends of the ileum and the transverse colon against each other to prevent dilatation of the ends.

Of my series of sixteen cases, every patient is still living. The clinical end-effects are uneven. Some were wholly relieved; others only partially. It is obvious that the entire question is still in the crucible. We must still suspend judgment.

1021 PROSPECT AVENUE.

“GAS-PAINS.”*

BY

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EVERY person upon whom an operation is to be performed dreads the anesthesia, the being reduced to insensibility, the taking away from him his ability to protect himself in a condition of danger. Anesthesia is abhorrent to us all, but to anyone who has had an operation, particularly an abdominal one, the recollection of “gas-pains,” with its prolonged treatment and torture, is even more deterring than the anesthetic.

It is the duty of the surgeon to reduce his death rate, to save the hundredth man. It is not his only duty, however, to reduce mortality and morbidity, but to promote convalescence and render it as comfortable as possible.

The great improvement in surgical methods, the broad knowledge of the responsibilities of the profession, the intense study into post-operative conditions and their control, have greatly modified surgical procedures in the last thirty years. When abdominal conditions were first operated upon, the hemorrhage and handling of viscera, the uncertain attack and incomplete work with unnecessary drainage, led to a postoperative complication which was severe, dangerous and very distressing to the patient (and to the surgeon as well), namely: pseudo-ileus. How well we recollect when looking back into the past, sitting on the anxious seat and plugging away in Greig

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Smith over the chapter on tympanitis, pseudo-ileus and *peritonitis*; conditions for which we blamed the lesion, and now blame ourselves. As knowledge increased and methods became milder, pseudo-ileus ceased to be one of our fears; so that to-day rarely, if at all, does an intern meet such a condition in his hospital service.

Following pseudo-ileus came marked tympany, protracted, embarrassing, engendering fear as to its outcome, and receiving active, annoying treatment from doctor and nurse.

The surgeon of the present day, in place of these conditions, is disturbed by the complaints of the patients because of "gas-pains." These pains being more subjective than objective are, sometimes, passed by with the statement: "She is so nervous." Interns are up on night calls repeatedly, their efficiency thereby being diminished by this condition, and would-be patients often postpone operation because of the stories told by those who have suffered.

It is interesting to study the history of this abdominal reaction as noted by the different lights of the past, correlating their methods of work, the knowledge of their day, and the treatment they felt was proper and sufficient:

Tait(1) in 1873 considered it a paresis of the intestine, leading to a kink or kinking in different portions of the gut. He was inclined to the opinion that it was one link in the chain leading to peritonitis. If peristalsis could be established the condition ceased and the dangers were passed. For this he administered Epsom salts. This impressed the surgical mind for a considerable period, so much so, that in the '90's, McCosh, while operating, would inject with a needle a solution of Epsom salts into the lumen of the gut.

In 1887 Malcom(2) noted the reaction of the intestine while exposed, and made exhaustive studies as best he could. He claimed there was a reflex arterial reaction, local and general, and that the phenomenon of pseudo-ileus (which is the grandparent, as it were, of "gas-pains") was a systemic reaction as well as a local condition; and that any procedure, which drew down the gases and facilitated their discharge, would by some mysterious method control this reflex condition immediately and lead to restitution and comfort.

In 1888 Olshausen,(3) writing on this topic, considered it a disturbance of circulation in the small intestine, whereas,

Verchere,(4) the same date, blamed the absorption of poisonous substances from the intestinal tract.

Crile,(5) 1903, after a series of remarkable and extensive psychological and physiological studies of the conditions pertaining to shock, local and general, studying and experimenting on the different tissues

of the body (brain, adrenals, liver, etc.), determined that trauma of the intestine affected the vasomotor system in particular; that in a short time after the viscera were taken from their natural bed and exposed to the air, aberrant vessels would appear and the intestine change in color and in consistence; that it underwent a rapid lack of tonus, which was very soon followed by arterial hypotension, associated with exhaustion of the central vasomotor mechanism; and, if this continued for a time, there was chromatolysis in the Nissl substance with similar changes in the cells of the adrenals and liver.

In 1909 Yandel Henderson(6) was led from his observations to look upon the phenomenon exhibited from another viewpoint. With him, carbonic acid and its stimulating effect upon the vasomotor tissue was the pathogenic factor most important in intestinal activity. He claimed that anesthesia alone, that is, without operation, may be followed by the syndrome known as "gas-pains;" that ether by the open method, stimulating the respiratory center, leads to an active discharge from the blood of carbonic acid, and a condition of acapnia in the tissues. He found that when the abdomen is opened there is exhaled from the viscera, when exposed to the air or moist gauze, an excessive amount of carbonic acid; the intestine failing to retain sufficient carbonic acid to maintain tonus, paresis, dilatation and subsequent conditions follow; that the diminution in the amount of carbonic acid in the system is preceded by exaggerated breathing; and that, when loss of carbonic acid in the lungs and exhalation by the viscera are prevented, normal activity of the intestinal tract is maintained, postoperative peristalsis quickly resumed, and "gas-pains" diminished or absent. His observations indicate that carbonic acid tension in the nerve centers, and in the tissues and fluids of the body, is the factor in the maintenance of tonus in the broad sense of the word, "of the same order of importance as temperature, oxygen supply, osmotic pressure, and equilibrium of the anions and cations." It, however, does not exist in the blood as a gas, but dissolved, largely combined with alkalies and in part ionized.(21)

Mall,(7) 1896, showed that the intestine has two contracting waves: a rapid one, of about twelve per minute, for propulsion of the contents; and another, of one or two per minute, which he considered the intestinal pulse; the appendix, even, taking on the same action. The submucous venous plexus, in totality, must be of considerable consequence as to the volume of blood and the contractions, undoubtedly, are a sufficient cause for sustained circulation through the liver.

Miller(8), 1911, states that the mesenteric plexus differs from the true nerve plexus both in structure and staining reaction.

Keith(9), 1915, as a result of a long series of investigations of the gastro-enteric tract of various animals and the colons, referred to him by Arbuthnot Lane and others, claims the discovery that there are just above the cardiac orifice, in the second portion of the duodenum, at the ileocecal collar and in the large intestine, elaborations of the plexus which prove to be pace-making nodes for the activation of peristalsis. In other words, that Auerbach's plexus resembles histologically and physiologically the auriculo-ventricular bundle; that peristalsis is very similar to cardiac contractions; that one of the functions of the intestinal tract is similar to that of the cardiovascular, that is, the circulation of the blood. Keith even goes so far as to suggest that cardiac rhythm may be instigated in the abdomen.

Thus we see that this intra-abdominal pathology is varied according to clinical experience, acumen, and care; that the explanation of the phenomenon produced is varied according to our increase of knowledge of the different tissues, fluids, and gases of the body and their interdependence and importance; and, whereas, each observer is undoubtedly correct in part, the correlation of the factors must be studied in order to institute a rational and effective mode of treatment.

The susceptibility of the gastro-enteric tract to reflex effects has been known for centuries; as for instance, the mustard cloth to the pit of the stomach for the relief of pain, the scratching across the upper abdomen to activate a lazy upper colon, and similar irritation over the lumbar region to stimulate the rectum.

Metzler and Auer(10) found that dissection of the skin over the abdomen produced reflex inhibition of peristalsis.

Henderson's notions as to carbonic acid being the important factor in the tonus of the unstriated muscle are confirmed by several clinical observations. In the Nauheim(11) treatment of cardiac lesions carbonic acid in the bath stimulates the skin and its circulation so that it becomes pink. The arterioles and the terminal arteries dilate, thereby giving relief to the hypertension of the vascular system, reducing the blood pressure, and relieving the strained heart. If, instead of carbonic acid, oxygen be applied to the skin in a similar way, we have pallor and contracted blood-vessels. Effervescent purges are much more active, prompt, and efficient.

Decomposition of the carbohydrates in the intestinal tract leads to the formation of carbonic acid; and, according to the amount

of this gas, do we have activation of the gut (18 and 23). Death by hanging, which through asphyxia leads to a surcharge of carbonic acid in the system, has a cathartic action(13). The woman in labor who holds her breath, carbonizes herself and, thereby, delivers herself more effectively than the woman who moans and cries and uses each inspiration for complaint(6).

Pieces of the intestinal tract placed in mildly effervescent carbonic solutions keep up a peristalsis which is lacking when other media are employed. So there is a physiological reason back of Henderson's discovery.

In all operations we have three factors that must be before our minds continually: the importance of the lesion, systemic conditions, and the co-equal danger of the surgeon and anesthetist. Anesthesia as written in our books is largely a rattle of old bones, but from our journals and laboratory reports we are learning much which will tend, we hope, to bring about more sensible methods of narcosis in the immediate future.

So far as the abdomen is concerned, ether itself, so says Henderson,(6 and 21) but slightly disturbs the intestinal peristalsis in the laboratory animal, but, if the abdomen be opened and the anesthesia be administered by the open method, which means stimulation of the respiratory center, increased rapidity of breathing, a rapid discharge of carbonic acid and lowering of the carbonic acid tension in the tissues, we find that the intestines are not moving. The exhalation of carbonic acid gas in the exposed peritoneal surfaces is 0.2 c.c. per square centimeter in the first half hour, and the intestinal musculature through systemic and local loss is quickly deprived of its normal tonic agent.

Anesthesia by the closed method, and curiously enough, the profession is coming back to it unconsciously through the application of towels to the gauzes used, means less carbonic acid is being lost in respiration because of some rebreathing. So, under these conditions, visceral tonus is longer maintained. Rarely(7) do we obtain shock, local or systemic, except through abdominal operations, and even then not to a great extent if there be no loss of blood a minimum amount of manipulation and no exposure of the intestine. Moist gauze packing with wide retraction favors carbonic acid elimination. It has been well said that the responsibility of the surgeon and anesthetist is co-equal in mortality and morbidity.

A study of the physiology of the body, particularly under stress, leads one to believe nature demands that each tissue perform other

functions than those ordinarily considered normal, thereby developing a greater efficiency.

As we study now the different hypotheses presented and the observations noted, it will be seen that the early investigators had only such knowledge as would lead them to note the contents of the intestinal tract, which is a septic fluid containing active germs, and their explanations were natural. Malcolm, with his mind set on the vasomotor system, very properly exploited certain phenomena the result of continued overstimulation. Crile goes further. He is the first to enunciate the broad principle that every tissue of the body allies itself when some other part becomes war-like. He investigated and found that certain cerebral cells, the adrenal cells and the liver cells, act together; and together they become exhausted in the effort to maintain body tonus. The one tissue that had not been investigated was left to Keith; through his researches we have, seemingly, a harmonious development of the entire pathology of the syndrome under discussion.

When a surgeon opens an abdomen he sees the intestines pale, gray, flattened, no vessels, and apparently no content. If he waits a while and does not touch but simply gazes at them, he will see vessels appear on the intestines and mesentery. Slowly the intestines change to a dark red color, gases form in the interior, and they become distended. As this proceeds, the intestinal coils fill, round out at the end, kink, and produce numerous imitations of "Vella's loops."⁽¹³⁾ Laboratory studies lead us to believe that into each intestinal loop fluid is transuded, germs become active and multiply rapidly. It is this bowel distension and the accompanying inactivity of the organ which cause the pain suffered later. A stethoscope applied to the abdomen after such an operation, fails to hear any tinkle, or evidence of intestinal life.

After an operation where we have had, as a result of exposure, carbonic acid loss and myenteric arrhythmia or block, vasomotor reflex, as well as stress affecting the brain and glandular organs, plus enteric infection, a composite picture will be produced which demonstrates that each observer found a truth but not the whole truth.

The epigrammatic Byron Robinson⁽¹⁴⁾ says, "the chief duty of a physician is to cure functions. A physician comprehending pathological physiology becomes master of suggestions for the patient's benefit." Through a thorough comprehension of the many factors entering into postoperative intestinal stasis are we better enabled to apply, in all sanity, methods of treatment for the relief of pain and return of the proper peristaltic waves.

As preventive, clinicians have discovered, and the laboratory has confirmed, the immense value of a preoperative injection of morphine-atropin. According to Crile(5), morphine interferes with the oxidation of the Nissl substance and, to a considerable degree, prevents the animal's susceptibility to shock. According to Henderson(6), also Higgins and Means(23), it maintains a better carbonic acid content in the blood. Miller(8) claims that "a patient comes into the operating room more composed and tranquil, the induction period is shortened, excitement lessened, more perfect anesthesia obtained, with better relaxation and lessened secretion of mucus, and cardio-inhibitory shock prevented, although the effect is not altogether ideal."

As the reflexes in the abdomen are so ready and rapid, and the distal effect so great and permanent, operative procedure should be as free from manipulation as conditions will allow. As hemorrhage lowers blood tension, and the effect of lowered blood tension is the production of chromatolysis, it should compel a bloodless surgery.

As the omentum is the only efficient intestinal protector(6), it is well it be kept over the intestines as far as possible. Any necessary packing should have it between the pack and the gut, the abdomen being gently raised as the packs are applied.

If the link in the chain given us by Henderson be correct, anesthesia should be ether by the closed method, although gas-oxygen may be preferable if the patient be kept pink. Postoperative treatment is as uncertain and as ineffective as that of any diseased condition, prevention being far better and more certain than efforts at cure.

Of the pharmaceuticals we have belladonna, eserine, and physostigmine. Belladonna has long ceased to be used. Eserine was exploited for a number of years, but we hear little of it now because its action is local. Metzler and Auer(10) say that physostigmine salicylate produces a marked but temporary increase of peristalsis in cases of reflex inhibition. Forchheimer(15) considers it a powerful stimulant of intestinal paralysis and claims it should be employed with extreme caution as it is apt to produce enterospasm and congestion of the gut. He expresses the same fears as to eserine. I have had no experience with hormonal, nor can I find sufficient literature that will allow me to exploit its advantages or defects. Piltuitrine(22), acting on unstriated muscle, is most efficient, provided there are no great changes in the gut. We meet with failure in advanced complicated conditions. Very probably in minor conditions

any one of these preparations may be followed by active peristalsis, discharge of gases, easement, and recovery.

But in the marked condition of meteorism where the stethoscope fails to get a tinkle, where the patient is miserable as well as the abdomen, where we know that Crile's chromatolysis may be proceeding, something which will meet *all* the indications presented in this paper should be employed, something which is on nature's lines and will aid her, some method of treatment, not overdisturbing to the patient, but productive of prompt relief of mind and body.

In 1900, Kemp(16) issued a little book on enteroclysis. It was published by an unimportant firm and had no general sale. His investigations have not been greatly exploited, but, for over ten years, I have been using in Christ Hospital the double current rectal irrigation as advised by him: If a normal saline solution, or plain water, enter the rectum at a temperature of 120° not as it is poured into the bag(13) be passed into the rectum and out again for twenty or thirty minutes, a marked physiological stimulation and betterment of function will occur through the entire anatomy. The water should be flowing constantly, with occasional compression of the exit tube to better allow the large gut.

Cannon(11) tells us that fluids thrown into the rectum induce antiperistaltic waves, and are thereby carried to the cecum. Dawbarn(19), while performing a laparotomy and using the Kemp's tube, saw the water reach the cecum. The position of the large gut is such that the hot water it contains will warm up and stimulate the circulation of the large sympathetic plexuses; so not only is the intestine cleansed, but, through physiological stimulation of the sympathetic, we obtain a reflex effect upon the small gut. Through its effect upon the gastro-intestinal tract there is relief of congestion and improved circulation in the stomach and duodenum, as well as in the intestines(20), and all internal organs are disencumbered.

At the end of twenty minutes the cutaneous reflex is felt, the skin warms and normal perspiration occurs. If continued for more than twenty minutes, the circulation in the kidneys is enhanced, diuresis being instituted. It is a well-known fact(15) that a warm, mildly perspiring skin soothes mental jactitation and anxieties and promotes slumber. Various methods have been tried by me from time to time, but my interns and nurses, who judge my work impartially, invariably fall back to the Kemp's tube.

Now that we have, apparently, the entire pathology of this syndrome, physiological deviations of each of the different tissues of the intestines being diagnosticated, a true remedy can be instituted.

The double-current high rectal irrigation with water at 120° F. seems to meet every indication in an advancing case of tympany. All other methods of treatment, so far as I am able to judge, seem to touch the condition but superficially. What is worth doing at all is worth doing well and thoroughly. What we do should be based on most competent knowledge and stand the test of criticism as well as experience, and in my practice the double-current high rectal irrigation has given the greatest success.

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280 MONTGOMERY ST.

DISCUSSION ON THE PAPERS OF DRS. CRILE, MEEKER* AND DICKINSON.

DR. HUGO O. PANTZER, Indianapolis, Indiana.—I wish to express my grateful appreciation for the rich offering we have in the three papers that have been presented this morning. I feel it is an injustice to the authors of these papers that each paper shall not have special and full time for discussion. I have to find the first case in which the indications warrant doing a short-circuiting operation or a colectomy. In saying this I am duly appreciative of what one man's experience means in the presence of an intricate subject, the knowledge and study of which has not transcended the initial stages.

*Dr. Meeker's paper will appear later.

I am very grateful for the observations reported by Dr. Meeker. For fifteen or more years I have proceeded along similar lines, cutting freely everything suggestive of a band or membrane that might be regarded as interfering with intestinal function. Anything interfering with the even, rhythmic movement of a bowel will invariably lead to local pouching or spastic contraction of the intestinal wall, and further to retention and what we now term intestinal stasis. To relieve this stasis these bands, membrane kinks and pouches must be obliterated.

It is astonishing to what extent in carrying out this principle you may and shall go. The uninitiated will see his marvel at such a proceeding. I do not use as much as one suture to the average case or apply more than one or two ligatures to bleeding vessels, in the most extensive division of such bands and membranes. The cutting is limited to transverse dissection of tissue which is essentially adventitious, *i.e.*, scar formation, having only terminal, nonoscillating blood-vessels. Care is necessary to avoid the normal tissues, but this is easily practised. All such tissue impeding bowel movement is cut until the bowel is absolutely free from such restraint. At the conclusion of such work the terminal ileum discharges its contents into the cecum at right angles as is normal. The cecum, so freed, may be found in an abnormally low position and is very loosely hung. But even within the short time that the patient is under observation in the hospital can be demonstrated by delicate palpation and percussion that the cecum has regained a higher, approximately normal position, and its wall be found free from the previous thickening (hypertrophied musculature). As to the ileocecal valve, its function returns practically at once to normal when the constricting bands are cut and the distorsion incident thereto is relieved. As to recidives, there are few and these commonly show the need of more cutting rather than the evidence of adhesions. I do not put in any oil to avoid adhesions. Why should adhesions form? When there is no undue handling of the parts, no infection introduced, and the bowel kept properly active after operation, such adhesions commonly have no occasion to form, nor if formed can withstand the effects of normal peristalsis for any time. The after-treatment has much to do with the success of the operation. I give a pint of fluid by rectum every four hours adding $\frac{1}{2}$ to 1 dram of sodium salicylate to each enema for its eliminating effect, and a few drops of camphor to tranquilize the bowel during the feeding. Care is had to keep the solution at about body temperature. The drop method is employed, giving it as fast as can be borne without exciting the rectum to contract. The nurse is instructed to remove the nozzle every time the patient complains of colic in the lower bowel, and to have the patient discharge or where abdominal tenderness makes this impossible, to introduce a rectal catheter an inch or two for siphonage. Rectal feeding is then resumed at once. For gas pain and for distention of the abdomen upon its very lightest manifestation physostigmin one-fiftieth grain hypodermically is given at once, and

followed fifteen minutes later by low Watkins. An alert nurse, following such directions, rarely, or practically not at all, will have develop gas pains or distention of degree that is distressing or menacing.

DR. FRANK D. GRAY, Jersey City, New Jersey.—In the first place, I wish to express my satisfaction and gratification at the conservatism voiced here this morning by Dr. Crile. I think that he has cast an anchor to windward on a subject that some have gone wild over. Furthermore, I would like to say a few words in discussion of the last paper.

As Dr. Dickinson so truly says, patients who have to be reoperated dread the anesthetic and the subsequent gas pains. To those might well be added the preliminary preparation. The paper gave us an admirable résumé of the literature on the subject, and it wound up by offering a very practical method of relief which I have used in about the same way and with the same results that Dr. Dickinson spoke of. There is one thing that the paper failed to emphasize and possibly rather deprecated, and that is the use of pituitrin. Pituitrin, when used in the presence of advanced meteorism, accompanied by gas pains, has but little effect. My plan—and I have found it referred to as Dr. Baker's plan, in the admirable address of our President this morning—is to systematically administer, or have it administered, pituitrin, in post-operative abdominal cases, using 1 c.c. hypodermatically every sixth hour for from twenty-four to twenty-six hours after operation and follow it with a purgative enema. I want to lay stress on a certain purgative enema which many of you may have used, and which was original with the late Dr. Nicholas Senn, of Chicago, and that is, milk and molasses enema, equal parts of each. My patients often call it dynamite. It does the work. To those of you who have not tried it, I would recommend it.

There is one peculiarity about these gas pains, that we do not always find them associated with meteorism. I have had patients now and then who complained of gas pains with a flat abdomen, so that there is something in the question of gas pains more than intestinal distention. I think if we will all endeavor to have our patients receive proper preparation, and I am coming more to the belief that much of it ought to be done on the operating table instead of beforehand, giving them a wise and sensible anesthesia, traumatizing them as little as possible and treating the gas pains somewhat along the line recommended this morning. If they should have to be reoperated, they will have less fear of the ordeal.

DR. JOHN W. POUCHER, Poughkeepsie, New York.—I have been very much interested this morning in this discussion, and particularly in these papers on intestinal stasis, and I merely want to give an experience I had about a year ago with a patient. A young man, thirty-two years of age, was brought to me by one of my colleagues. He had become a nervous wreck; he was unable to follow any employment, and after examination I decided that his trouble was due to a toxemia brought about by intestinal stasis entirely. He was

suffering from obstinate constipation and his nervous system was very much shattered. He had frequent epileptic convulsions, which he had acquired several years before. A series of x-ray pictures showed a very greatly distended cecum, with prolapse into the pelvis, and after careful consideration we decided to endeavor to relieve him by one of the operations for intestinal stasis. The operation we did was an ileosigmoidostomy, and with my limited experience with this operation the results have been remarkable. This young man had two convulsions while he was still in the hospital. This was ten months ago. He was discharged the fourteenth day, and since his discharge he has steadily improved. He has had no further convulsive attacks. He has increased in weight and in general health and is now holding a very important position and doing all his work satisfactorily.

I want merely to emphasize the satisfactory end result in this particular case. I have had but two of these cases, but I am so well satisfied with the results in this case that I thought it might be of interest to report them here. It seems to me that the epileptic or epileptiform convulsions from which he suffered were, in all probability, due to the effect of toxic absorption from his intestinal canal.

DR. OSCAR H. ELBRECHT, St. Louis, Missouri.—With reference to the subject of intestinal stasis, I desire to call your attention to the fact that Mr. Lane has brought this matter before the profession more than anyone else. I felt thoroughly prejudiced on this subject before I saw some of Mr. Lane's work. I felt exactly as the papers have brought out this morning, that we go into this matter with a prejudiced mind. I spent some time with Mr. Lane, and had the opportunity a few years ago of seeing a most unusual clinic. During the International Medical Congress Mr. Lane lined up thirty-six of his post-operative cases for us and showed the results, and permitted anyone of us to talk to these patients on whom he had operated and allow them to tell their own story. I saw each case that was operated. I saw a case that any one of us would say it was suitable on which to do a colectomy.

Mr. Lane's work has been misunderstood. I for one felt that he had gone too far, but I do believe now that Mr. Lane is pushing back and coming back to practically what our American operators have done, that is, in doing resection of the ascending colon only. As you may remember, Mr. Lane first did ileosigmoidostomy, and then he went ahead and did colectomy. Now, I believe, he is swinging toward the position taken by American operators, that it is unnecessary to do a colectomy because in the majority of cases it is the large club-shaped cecum that is doing the work and not the transverse colon that is doing it. If you turn the fecal contents into the transverse colon it has a good chance to get down, but it has not got a chance to get out of the club-shaped cecum that is held down. To release the adhesions, as was discussed this morning, does not suffice for the class of cases that Mr. Lane is talking about. The one thing he tries to impress every one with is that

he is not doing his work for chronic constipation, but rather to prevent toxemia, and one of the most common and prominent and constant symptoms that he dwells on was not brought out in these papers. You walk up to a patient even on a hot day like this and you find her hands are cold and clammy, and every patient he has operated on had that symptom, and yet after operation you can shake hands with these patients and find that they are warm and nice. These patients will have a healthy glow and good color of the skin. This is a direct index as to chronic toxemia.

With reference to small adhesions, I have seen abdomens opened in this country with a view to doing the same operation that I certainly would have closed up and felt that the cases were not suitable for operation for the relief of chronic constipation. In other words, there was not sufficient toxemia to justify that operation.

I feel that these papers are important in that they have sent out a note of warning which is absolutely necessary to guard against indiscriminate operating that has been going on in this and other countries as the result of Mr. Lane's work being misunderstood, and operations have been done simply for chronic constipation instead of to prevent toxemias. All of us feel that something must be done to relieve this condition.

As to the end results of the treatment, I find in discussing the matter with these patients that they use the Russian oil with the greatest variability. Some of the patients will take as much as a pint a day without any inconvenience or disturbance. Mr. Lane says that the average dose of oil is nothing like the usual dose, or that was the dose they usually recommended. Mr. Lane does not know the dose for each individual patient. He says, give them the oil and let them work it out for themselves. It is not going to do them any harm.

Some one made reference to the point that two-thirds of the cases were not being relieved by surgical procedure.

DR. CRILE.—Three-fifths.

DR. ELBRECHT.—That tallies pretty well with Mr. Lane's results. Mr. Lane is not simply operating for the relief of constipation but for the profound toxemia that is present in these cases.

DR. CRILE (closing).—It seems to me that it is an odd fact that the human race only has intestinal stasis; apparently neither wild beasts nor domestic animals are affected by that disorder. I imagine that before we know what are the real causes of intestinal stasis we shall have to consider the relation to its causation of a far larger number of organs than at present we consider in that connection. One suggestion that occurs to me is the possible relation of the adrenals to intestinal stasis. We know that adrenalin inhibits contractions of the intestinal muscles. We know that the adrenal glands put out an increased amount of adrenalin in response to emotion, to worry, to fear, to anger, and that an increased output of adrenalin is produced by all infections and by indol and skatol. The specific action of adrenalin being inhibition

of the activity of the intestinal muscles any one of these agents may prove to be the causative factor in a given case of intestinal stasis.

I would like to restate something in this discussion that our distinguished president referred to in his splendid address. I do not wish it to be understood that I advocate the opium treatment of peritonitis as a separate independent treatment, and nothing else. In this connection Alonzo Clark's article on opium treatment in Pepper's System of Medicine is most suggestive. In two cases out of a hundred of acute infection of the gall-bladder for example, or any other abdominal infection you will have a terrible struggle and will probably lose the patient. That is the kind of case in which every method of which we know to-day should be employed: enormous quantities of water; proctoclysis; large hot packs; the Fowler position and drainage. If in addition to all these measures you employ the Alonzo Clark opium treatment, you will be amazed to find how your desperate cases will pull through. Do not give small doses of opium, but large ones until the respirations are reduced to about ten or twelve per minute. You will then be astonished to find how opium blocks the whole transformation of energy in the body and checks the normal processes. The patient will need scarcely any food but only water. The use of opium is continued only as long as the patient is in imminent danger.

DR. MEEKER (closing).—One cannot really get well started on the subject of intestinal stasis in twenty minutes. I realize that my paper was very incomplete. It has been my good fortune to assist Mr. Lane in some of his operations and to follow up some of the postoperative cases, the results in all cases were not absolutely satisfactory. Mr. Lane himself has had such wide experience, and is so dextrous, it is much easier for him to take out the colon than to attempt a peritoneal plastic repair. In fact he considers the delicate and painstaking work of relieving the constrictions and fixation caused by these bands, the more radical surgery.

It was gratifying to hear of the success Dr. Pantzer has had in following the principles of conservative surgery that have been brought to your attention.

DR. PANTZER spoke of the value of giving saline solution by rectum. Saline solution is of unquestionable value, it seems however a better plan to anticipate the shock of operation by administering the saline solution during the operation, rather than after the patient has been put to bed. This may be done by hypodermoclysis, from two to four pints of normal saline solution being injected under each breast. In this procedure the amount of fluid absorbed can be accurately determined and does away with the unpleasant experience of having a large amount of unabsorbed fluid expelled in the bed after a rectal drip has been in operation for several hours.

The technic of this is simple; after cleansing the skin just above the breast, it is lifted, putting it on the stretch. The needle is inserted so that it passes over the fascia of the pectoralis major into the cellular tissue beneath the breast. When the needle is in proper position its shoulder should be resting over the center of the con-

cavity of the acromial end of the clavicle, while the point is directed toward the ensiform process. The tubing is then out of the way of the operator and anesthetist and there is no dragging upon the needle. When the needle is inserted from the axilla the tube is in the way of the operator and very apt to become kinked, the needle is likely to be pressed upon by the surgeon or an assistant and its tip then makes a lateral tearing of the tissue, thus inviting hemorrhage, there is also less likelihood of the needle being thrust into the muscle tissue, when following the facial plane from above downward.

In regard to the abdominal support, the principle of the Curtis spring support, recommended by Mr. Lane is an excellent one, but there is great difficulty in getting patients to wear it unless they do so to please the doctor. One woman's expressive opinion of this type of support, was that it was, "heaven in front, but hell in the back." (Laughter.)

DR. DICKINSON (closing).—My experience is that some men are born leaders, while others follow the leaders, and inasmuch as I am not a leader I must necessarily be a follower.

I have always felt that the Laneites were in the right pew but in the wrong church, and from the acknowledgments that have been made here to-day I should say that they are not quite happy. If they love physiology and psychology as much as Crile and I do, they would find something in Auerbach's plexus and would stop cutting out colons and giving oil. I prefer to give these patients horse bran. I like it better than oil, for the reason that oil slips through and spoils the linen, while the bran does not.

THE USE OF LUTEUM EXTRACT IN THE TREATMENT OF MENSTRUAL DISORDERS.*

BY

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WHEN one essays to present a dissertation, no matter how brief, on the topic of corpus luteum therapy, it is at least assumed that he possesses some special knowledge of the subject, which, in all probability, is the result of extensive observation or investigation. In this instance, however, such is not the case. I have incorporated herewith little of scientific value or true originality.

A discussion of the time-worn text-book subjects of amenorrhea, dysmenorrhea and other phases of altered menstrual flow, and a consideration of the relation of these symptoms to certain underlying pelvic or constitutional conditions, would be decidedly bore-some, hence it is my intention only to offer, in an epitomized form,

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a few case histories embracing the result of personal experience with the use of luteum extract, combined with a small amount of comment as to the indications for its administration and the limits of its action.

To the corpus luteum is attributed a twofold action: First, of preventing the formation of an excess of scar tissue in the ovary, following follicular rupture and ovular expulsion; and, second, of subsequently elaborating an internal secretion.

As a result of an extensive series of experiments, it has become a well-established fact that this internal secretion exercises an important influence upon the sexual cycle, such as causing the phenomenon of menstruation, controlling the nutrition of the uterus and, if pregnancy occurs, probably aiding in the attachment of the ovum to the wall of the uterus by causing the endometrial changes which characterize the decidua. It seems also to influence the physical development of the woman and bears a distinct relationship to the other body glands of internal secretion, thereby aiding in the maintenance of normal metabolism.

Some years ago, acting upon the assumption that the ovary harbored this action, an immense amount of interest was taken in the possibility of successfully treating with ovarian extract, certain gynecologic disorders which could be theoretically attributed to hyposecretion of this organ. Little benefit was gained, however, in these cases for the obvious reason that we now know that the ovary, as a whole, did not furnish this active principle.

Following the valuable demonstration of Fraenkel and Loeb, enhanced by the reports from such men as Burnam, Kelly, McDonald and others, the corpus luteum extract supplanted the ovarian extract in therapeutic use and now we are well agreed as to its efficacy where there are certain given indications.

Its chief field of usefulness seems to be, (1) in the treatment of functional amenorrhea, (2) the neuroses of the natural, artificial and premature menopause and (3) in those cases which come under the head of the so-called "ovarian deficiency" type, occurring during menstrual life.

In this last class, dysmenorrhea should be especially included. In my own private practice I have observed, in a truly extraordinary manner, the cure or relief of many such cases through the medium of this type of organotherapy. My best results, however, have been gained in the administration of corpus luteum for the relief of the severe nervous symptoms attendant upon the menopause of both the physiological and artificial varieties and the functional amenorrhea of young women.

As illustrative of the action of corpus luteum in functional amenorrhea, I have two cases of interest which I should like to describe briefly: The first case is that of a young school girl, aged fifteen, who consulted me in November, 1914. She had first menstruated two years before this time. Six months had elapsed before the next period appeared. She menstruated but three times in the following year and when I first saw her, the history given was of amenorrhea for a period of nearly four months. Her weight was 196 pounds, and she had gained in weight rapidly during this time. She was very nervous, irritable and depressed. She had given up school because "it worried her so much." The appetite was good, but she complained of much disturbance of digestion. I commenced treatment by giving her luteum in the dose of 10 grains, three times a day. Three weeks later she menstruated normally. At this time I added thyroid extract in the dosage of five 2-grain tablets a day. She has continued the use of these two extracts up to the present time, with but one short intermission and a slight decrease in the dosage of the luteum extract. When last seen, on the second of this month, after having returned from a stay in the country for the summer, she weighed 167 pounds, a loss of 29 pounds, and has menstruated regularly every five weeks since the treatment was begun. There is absolute cessation of the nervous and digestive symptoms.

The next case is of a similar nature: A young married woman, aged nineteen, consulted me concerning arrangements for her confinement which she anticipated in another month's time. She gave a history of amenorrhea for eight months; during this time she was "sure she felt the motion of the child." On casual inspection she certainly looked the part of a pregnant woman; but upon examination she was found to possess a small infantile uterus and a hypoplastic condition of the genitals. An enormous deposition of fat was evident, especially on the abdomen and in the breasts. The hemoglobin about 70 per cent. She was drowsy, asthenic, at times exceedingly nervous, and has experienced violent attacks of tachycardia on several occasions. Bland's mass by mouth and iron citrate by injection, *plus* corpus luteum (30 grains a day) was prescribed. Her general and nervous condition gradually improved and menstruation appeared shortly thereafter. I saw this patient regularly for four months. During this period she menstruated four times with fairly normal intervals. I have had no opportunity to see her since.

In these two cases we have conditions of distinct similarity. While it is evident and granted that there was ovarian insufficiency present in both instances, one must consider diminished pituitary

function in the second. Here were present the various symptoms which would point to probable hypopituitarism with the resulting progressive general obesity associated with atrophic changes in the genitalia. No doubt, too, there was abnormal secretion of the thyroid which would explain the nervous symptoms. As Bandler states it, "if there is a diminution of the ovarian and thyroid activity and the ovarian activity is so diminished that a relative degree of thyroid hypersecretion exists, we have, in addition to the increase in weight, an excitable condition due to this thyroid hypersecretion."

There is no doubt that some cases of obesity with amenorrhea are due to ovarian inactivity; some are due to diminished thyroid function; many are of the so-called hypophysis type and, in all probability, many are due to an involvement which includes failure of function in more than one of these glands; as is illustrated in the cases just mentioned.

In the neuroses of the surgical and natural menopause, as I have said before, the corpus luteum therapy plays a most important part. The nervous, digestive and circulatory disturbances of the climacteric may be frequently controlled by its use. Likewise its efficiency in controlling similar symptoms, following hysterectomy and oophorectomy, has been repeatedly demonstrated. I consider it a necessary adjunct to the treatment of such cases.

Two years ago I removed the right tube and ovary from a woman in whom a ruptured tubal pregnancy on the opposite side had occurred a year and a half previously and, at which time a salpingectomy and oophorectomy was done on the left side. Shortly after my operation she experienced all the extreme and disagreeable symptoms of the climacteric to such an intense degree that her work, as a dressmaker, was greatly interfered with. No relief was obtained until she began the use of corpus luteum. Thirty grains a day soon brought about complete cessation of the symptoms. She still continues the use of the product in decreased dosage and can dispense with its ingestion for considerable intervals of time without experiencing any immediate return of discomfort.

In the treatment of those patients who, during their menstrual life, show severe nervous phenomena such as irritability, malaise and depression, accompanied by headache and scanty menstruation, corpus luteum is obviously indicated. It is really astonishing to see how quickly there is a change for the better. How often, too, do we see patients who suffer with dysmenorrhea, presenting this same train of symptoms, indicative of insufficient ovarian function.

This brings me to the subject of dysmenorrhea. I do want to make mention of my small experience with this condition in relation to my experience with corpus luteum extract as the remedial agent. The results gained by corpus luteum therapy, as applied to dysmenorrhea, have been far from remarkable, although the reports of some observers show its undisputed value, when utilized in those cases where functional ovarian deficiency is present. I have used it with varied results, but the recital of two cases of dysmenorrhea, in which absolute relief was obtained through its use, should have some weight in the consideration of this subject.

The first case was that of a married woman, aet. thirty-two, who had suffered intense pain at her periods ever since menstruation made its appearance. She had never been pregnant. The flow was normal in amount and occurred at regular intervals. I used every method known to me to relieve the condition. I confess that I often resorted to morphine. She experienced this pain only on the first day of the flow. She had an acutely anteфлекed uterus with apparent cervical stenosis. I performed a dilatation and posterior division of the cervix, but no relief followed. I tried corpus luteum, giving her one 5-grain tablet three times a day; increasing to two 5-grain tablets three times a day, a week or ten days preceding the period. At first no appreciable relief was observed, but, subsequently, she menstruated almost painlessly. This was in the Spring of 1913. I have since received word from this patient, stating that she still uses the corpus luteum tablets, and that she has no pain at the time of menstruation. Relief after seventeen years suffering!

I have a parallel case in a woman, aged thirty, a semi-invalid, who is thin and poorly nourished. Her menstruation was regular but scanty, and she had always suffered much pain on the first day of menstruation. The pelvic organs are seemingly normal. Fifteen to thirty grains of lutein extract a day has relieved the pain almost entirely, increased the flow and bettered her general condition. These are but two of a dozen such cases which I have in mind, but they are sufficient to illustrate my point.

The fact that dysmenorrhea is oftentimes amenable to this therapy allows for some interesting theorization as to its exact mode of action. The ovarian secretion is responsible for menstruation. That is a well-proven fact. We also know that the result of this action is a periodic hyperemia of the uterus, and thickening of the endometrium followed by diapedesis of erythrocytes, rupture

of dilated capillaries and the formation of small hematmata; this is again followed by rupture of the subepithelial hematmata and exfoliation of small portions of the uterine mucosa. Yet this description does not fully cover the action of the ovarian internal secretion. To illustrate, let us take an analogy from the alimentary system. Inasmuch as we know that the hormone of the duodenum, called secretin, passes through the blood stream to the pancreas and there stimulates the acinar cells to pour out their enzymes, so it is quite possible to believe that the ovarian secretion acts as a hormone in the uterus. In addition to acting as a vasodilator of the uterine capillaries, it has perhaps a further selective action in exciting or stimulating an intracellular or autolytic enzyme in the endometrium, which so softens and digests the histological elements of this tissue that the physiological phenomena, previously described (namely, diapedesis, rupture of hematmata and exfoliation of mucous membrane) are made possible and easy, thereby constituting normal menstruation.

Such a theory as this furnishes for me an attractive explanation of some cases of dysmenorrhea of the so-called congestive or membranous type; for, where the ovarian hormone is altered or lessened, it may fail to excite in sufficient amount the uterine autolytic enzyme with the result that the endometrium, lacking its proper preparation and softening, acts as a barrier to an easy escape of blood; the congested membrane either remains to form a foreign body and set up uterine spasm, or becomes detached in the comparatively large portions that are characteristic of membranous dysmenorrhea. For this reason, I put forward the suggestion that the cases most suitable for the administration of corpus luteum are those which are characterized by excessive first-day pain, with scanty discharge, suggestive of an intense unrelieved congestion, usually followed later by a free flow and immediate relief of pain.

From my little experience, I am certain that there are cases of dysmenorrhea in which the main causal factor is deficient action of the natural corpus luteum. I am not carried away with the idea that the therapy of corpus luteum is a "cure-all" in any sense of the word; on the other hand, the cases which may be traced to ovarian deficiency are probably in the distinct minority. One must not allow himself to be so impressed with the etiological value of some one factor in the cause of disease, that he forgets, or becomes indifferent, to other factors of equal importance.

Surgery is necessarily indicated in those cases where we find pelvic pathological conditions or anatomical abnormalities, which

we are wont to consider as the probable causes of dismenorrhea. Too often, however, do we resort to operation and, consequently, too often are we disappointed in the results, because the defect is not surgical but glandular. Again more often than one would think, is organotherapy indicated in conjunction with surgical intervention.

There are some serious drawbacks to the use of corpus luteum. It generally has to be used routinely or continuously to obtain and to maintain results. Its cost hinders its more frequent administration. Its action is not immediate, it is cumulative; for that reason patients, and we ourselves, too often discard its use after a short trial, if it has been unproductive of good results.

As regards its dosage, I find that from 15 to 30 grains a day, seldom more, is sufficient in any case. Its prolonged administration has not brought about any untoward symptoms in my cases; with, perhaps, the possible exception of slight gastric disturbance in one or two instances.

The subject of organotherapy, in its present experimental state, is rather involved and indefinite, and while it is sometimes difficult to recognize and identify the cases which would be benefitted by corpus luteum, yet when there is a possibility of "ovarian deficiency" being an etiological factor in any gynecological disorder, we owe it to the patient to make use of this remedial agency, for its value is well determined.

192 STATE STREET.

DISCUSSION.

DR. D. TOD GILLIAM, Columbus, Ohio.—I have only one or two remarks to make. The first statement made by the essayist is admirable and one which should teach us a good deal. There is one feature he has not mentioned, and which as I believe is very important, namely, you must give it for its physiological effects. Until you see evidences of diminished blood pressure. I do not think you have got to the point where you ought to stop. I have had experience with the luteum extract, both favorable and unfavorable, and in the revision of my work on gynecology I have given it a kind of black-eye; nevertheless, I have had some elegant results from it, especially when carried to its physiological effects and maintained for a while.

DR. J. HENRY CARSTENS, Detroit, Michigan.—The very modest paper which Dr. Leighton has read is a help to us in showing some of the things that we can do to assist these peculiar cases, but there is this thing about it: The patient to whom he gave this extract was relieved for ten days, showing that we must keep on dosing them all the time. If the gentleman in some of these cases will introduce a silver stem pessary, about which I have spoken time and again, and I am sorry I have to hammer this in, he will not only develop

the uterus, he will not only keep it open and prevent spasmodic dysmenorrhea, but he will stimulate the growth and development of the uterus, which is generally an infantile uterus more or less, and he will also stimulate the growth and development of the ovaries, and as a result the patient will have plenty corpus luteum secretion and a supply of ovarian secretion, and if she should wear a stem pessary for six months she will be absolutely cured without medicine because she will then have normal pelvic organs.

DR. ARTHUR THOMAS JONES, Providence, Rhode Island.—With reference to organotherapy, I think the profession is divided into two classes. As a rule, one class loses its head over organotherapy and believes everything can be cured by organic extracts. The other class is that group who would not give organic extracts if they knew they were going to get a good result. They will not take it up; they never have tried it. I believe these extracts are of value, and particularly the corpus luteum extract. I have had considerable experience with the use of lutein tablets, particularly in cases of surgical menopause. I have always used the tablet of Hynson, Wescott & Co. We are too inclined to say, "oh, well, we do not have many cases where the artificial menopause is troublesome," and we dismiss it with very little thought, but we do occasionally have a case in which the symptoms are very distressing. I recall one case in particular in a young woman upon whom I did a hysterectomy and had to sacrifice both ovaries that were badly diseased. The symptoms in that case were particularly distressing and the girl was almost driven to suicide. The doctors in the country were talking about sending her to a sanitarium for treatment. After two weeks use of the luteum extract that girl's mental condition cleared up, and she resumed her work in one of the jewelry factories, was perfectly comfortable and well so far as mental symptoms were concerned.

I have had any number of cases in which there were flashes of heat or bad perspiring spells, and I have found that the luteum extract will control these very nicely. We ought to give this a trial, particularly those who are doing surgery and have to sacrifice both ovaries. You will give your patients great relief. In cases of amenorrhea the results are pleasing; you will likewise get good results in cases of deficient menstruation, and in a short time they are having good normal menstrual periods in many cases.

DR. O. H. ELBRECHT, St. Louis, Missouri.—I want to call attention to one thing in connection with these tablets which I have been using for six years or more. I am not here to advertise any particular manufacturing firm, but this is true of corpus luteum as was brought out in the doctor's paper. At first, we were using simply the desiccated ovarian extract, commonly called the ovarian extract, which has been proven to be practically inert. The next step was the beef extract put out by a certain pharmaceutical company. At that time I had several cases on hand and I told this firm I would be glad to use their product if it proved efficacious. They furnished it to me, but having very little faith in it, I gave it to these patients

ad libitum with no results. I am free to say, however, that the tablets of Hynson and Westcott, which are made from the corpus luteum of the pregnant sow are an efficient product. I have also had failures as well as good results. Where there is no hyposecretion you have got to feel your way in using so harmless a method. But just as the essayist has reported, I succeeded in bringing about menstruation in a young girl who had missed menstruating for over a year. In that instance I used twelve 5-grain tablets each day. The only objection to it is the fact that it costs considerable money. I think these tablets are worth something like \$2.50 per bottle, and as soon as you get into giving large doses the patient will complain of the price of the treatment. There is no question but that form of luteum is excellent, and if you cannot give it in the prescribed doses and continue it, you might just as well prescribe something else. Unless you prescribe the luteum made from the pregnant sow you will not get results. The Hynson and Westcott tablets, recommended highly by Burnham and Kelly, are efficient, but higher in price. Parke, Davis and Company are following that plan and if you want to use tablets or capsules you can prescribe them, but they admit that their ovarian extract is not as successful as the other.

There is another form that has not been referred to which is given in hypodermic solution, which is in the experimental stage, and I would like to ask Dr. Schwarz to say something about that. But it strikes me, if we want to get active results by hypodermic administration why not use it that way. If it can be put up in sterile solution in acceptable form, why not use it in that manner? I have used it in the same form in the case of an obese woman, thirty-two years of age, allowing her to use it *ad libitum*, with no results.

DR. ORANGE G. PFAFF, Indianapolis, Indiana.—I dislike very much to advertise anybody's preparations, but I understood Dr. Elbrecht to say that the capsules of Parke, Davis and Company had proved in his hands inert. I do not know what changes they have made, but previous to the last six months I have used Parke, Davis and Company's corpus luteum capsules, and whether it was a coincident or otherwise, I have learned to think that we have found something of an ovarian stimulant or ovarian tonic, or whatever we may call it, because in a great many cases—at least in a number of cases—in my hands, especially in those young women attending boarding schools and who are in the developmental stage, with scanty and sometimes absent menstruation, I failed to get any results with the so-called emmenagogue list, but by using these capsules put up by Parke Davis and Company I have had quite a number of charming and delightful results in every way. Possibly they may be looked upon as coincidences, but I doubt it. I have also used the tablets and have had the good results spoken of. I think very frequently we get utter failures perhaps on account of not selecting cases properly, but I must say that I have had very good results from the use of these capsules.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—We are

still worshipping at the shrine of Lane and why not give the prostatic extract he speaks of.

DR. HUGO O. PANTZER, Indianapolis, Indiana.—It is only such a paper as Dr. Leighton has given us, reporting cases having had methodical treatment, that will bring order out of chaos. Perhaps nothing has been adduced in recent times that has been of more interest to the subject under discussion than the work during the last two years of Schroeder of the Rostock University. Both by animal experimentation and studies on the human to the fullest extent that this was possible, Schroeder, at last, has developed the scientific basis of menstruation. He shows conclusively that ovulation occurs at the fourteenth to the sixteenth day. Then the uterine mucosa takes on activity. The uterine mucosa, as is long known, desquamates from the first to the fourth day of the ordinary twenty-eight days' menstrual cycle. Then it regenerates itself and up to the sixteenth day is inactive. Under the influence of ovulation on the sixteenth day, the endometrium begins a secretory activity which in turn stimulates the corpus luteum formation, which completed on the twenty-eighth day, eventuates in desquamation and appearance of the monthly flow. To take up the cycle methodically, desquamation occurs the first to the fifth day, regeneration of mucosa from the fifth to the sixteenth day. Ovulation takes place on the fourteenth day, and secretion in the mucosa is established by the sixteenth day and the corpus luteum of menstruation begins its development, which matures at the close of the twenty-eighth day. This matter has pertinency here to the extent that the knowledge of this function would clearly indicate that the administration of the corpus luteum extract shall be with regard to the time and purpose of nature, namely, between the sixteenth and twenty-eighth day.

DR. LEIGHTON (closing the discussion).—I am very glad that my paper has elicited such a free discussion. With reference to the remarks made by Dr. Gilliam concerning blood pressure, I will say that I never had any untoward results such as a sudden drop in the blood pressure subsequent to the continuous use of the luteum extract. If it should drop 15 millimeters, it is time to discontinue giving the extract, but I have seen no such happening. The girl of whom I have spoken who had been under treatment since November, 1914, with the exception of one slight intermission, had no untoward symptoms whatsoever, and I have been careful to take the blood pressure at different times.

This therapy has its limitations, there can be no doubt about it. It is not a cure-all. There is one trouble, and that is, we do not use it enough! It is absolutely nontoxic. If we can get results with it, it is worth almost any price that it may cost. As one patient said to me, "if it should be \$15.00 a bottle I would want it." She was cured, and if we can get such results in patients who are otherwise unaided, it surely is worth it. One of the reasons why there have been so many failures is because it has not been used sufficiently. Some patients have used a hundred tablets and have then left off using them at a time when they were beginning to get results. I

have used the Hynson and Westcott product altogether, with one exception, and that in the case of the girl just mentioned, where I used Armour's tablets as well as thyroid extract. Undoubtedly the Hynson and Westcott tablets from the sow are the best. Burnam and Kelly have recommended very highly the use of these tablets.

THE PRESENT STATUS OF TWILIGHT SLEEP IN OBSTETRICS, BASED UPON A COLLECTION STUDY OF OVER 2000 CASES.*

BY

ABRAHAM J. RONGY, M. D., F. A. C. S.,

New York.

It is now one year since I presented a preliminary report on the use of scopolamine in obstetrics according to the technic as described by Gauss. In that report I stated, "Judging from our experience and observations we feel that this method of treatment should be given a fair trial. It is only a varied experience by competent men that will tend to settle this extremely interesting subject. It is the duty of the medical profession to set the public aright on this most important question. We must approach this subject both from a medical and humane aspect. If pain can be relieved, it is the duty of the physician to do so, and no effort should be spared to accomplish it."

The demand made by women of all classes for this form of treatment made it possible to make further observations and to apply this treatment not only to hospital ward cases, but also to a great number of women of a higher social strata.

As our experiences accumulated, we soon discovered that this form of treatment is best carried out in primiparæ, or in multiparæ in whom we have reason to suspect a tedious labor, and that it has no place in short labors. This, together with the fact that both mother and child require most careful watching, I pointed out very strongly at the February meeting of the section of Obstetrics of the New York Academy of Medicine.

In April I had the privilege to report my experience, based upon a study of 300 cases, at the annual meeting of the New York State Medical Society. I then stated: "In our enthusiasm we have overlooked the most essential fact in the entire procedure, namely,

* Read before the Twenty-eighth Annual Meeting of the American Association of Obstetricians and Gynecologists at Pittsburgh, Pa., September, 1915.

that twilight sleep and painless labor are not synonymous, and that in a large number of cases pain is actually influenced but little. Furthermore, the degree of pain bears no relation to amnesia."

We, as obstetricians, are now confronted with the problem of deciding scientifically whether a patient, manifesting the usual signs of pains during labor, even though she has no recollection of it subsequently, is actually suffering; or are these manifestations of pain transient in character leaving no permanent impression. We, too, must decide whether we are to judge the intrinsic value of this form of treatment from the standpoint of analgesia or amnesia. When administering this form of treatment, are we justified to accept labors as "painless" in which patients give expressions of pain and extreme suffering? I fully realize the many physiological and psychological problems involved, but it behooves us, as men of science, to settle this important question, in order that it may occupy its proper place in therapeutics. To bring the subject to a practical conclusion, may I ask you to direct your discussion to this question: *Is labor to be considered painless because the woman fails to recollect?*

In reviewing the history of obstetrics, we find that various therapeutic measures have been used, from time to time, to allay the pain accompanying labor; but, in most instances, the results were such that their adoption was in a general way impracticable. To Gauss must be credited the introduction of a method by which he obtains a state of seminarcosis with the use of scopolamine-morphine. His technic is definite, and the results obtained by him are more or less uniform. Gauss maintains that the method essentially consists in reducing the mother to a condition in which she still has nerve perception, but not mental perception. The mental state induced is not a loss of memory of previous events, but the inability to recollect what is transpiring while under the influence of the drug.

Clinically, the first sign of the action of the drug is pronounced weariness, which very soon passes into a quiet sleep occupying the whole of the intervals between the pains. During the uterine contractions, however, the patient is startled from her sleep, and apparently gives expression to pain. With the progress of the intoxication, thirst, dry throat with parched lips and flushing of the face are observed. Occasionally slight twitchings and motor restlessness takes place. After a longer action and sufficient dose, the sleep becomes deeper, so that even during pains, the patient does not become fully awake, and the only manifestations of pain is the

contortion of the facial muscles and slight groaning, but consciousness is, even at this stage, fully retained. This state must be evenly maintained by skillfully graduated dosage so that a cloudy, befuddled mental condition, the principal characteristic of which is a complete amnesia extending over the whole process of birth, is obtained.

In order to make a more comprehensive study of this method of treatment, I have endeavored to obtain all the available material by addressing a circular, in the form of a questionnaire, to obstetricians, throughout the country. I have been fortunate in receiving replies which, in the aggregate, give an experience of 2000 cases which will form the basis for this paper.

In gathering the statistics on this subject, it was my purpose to bring forth a discussion of the advantages and disadvantages of this form of treatment, and in this way crystallize the American medical opinion concerning it; so that the question of "Twilight Sleep" may, in a measure, be definitely settled. A summary of the results of the various investigators, as well as my own experience, brings forth the following conclusions.

1. That the method is practised according to technic of Gauss in fully 90 per cent. of the cases. The results were uniformly favorable to both mother and child. Complications and untoward effects took place in those cases only in which the dosage, as directed by Gauss, was not strictly adhered to.

2. The standard (stable) preparation of scopolamine was, at first, used but little. Open market preparations of hyoscine were employed, and this, in all probability, accounts for a great number of patients who suffered from marked restlessness. With the introduction of the stable (Straub) preparation of scopolamine, this factor has been greatly diminished.

3. Morphine, or narcophin, was not repeated except in extreme cases of restlessness.

4. Nearly all agree that the treatment should not be instituted until there are definite signs of active labor.

5. It is interesting to note that fully 90 per cent. of the patients were treated in a special room assigned for this purpose.

6. Seventy-five to eighty per cent. of all cases treated were primiparæ. The average duration of treatment in primiparæ was seven hours, in multiparæ four hours. The average number of injections in primiparæ was five and one-half, in multiparæ three.

7. In about 60 per cent. of cases the first stage was apparently shortened. All are unanimously agreed that the second stage is definitely prolonged. The third stage does not seem to be influenced.

8. Ten per cent. of the cases showed various degrees of restlessness requiring restraint.

9. Four cases showed signs of active delirium during the post-partum period, but all recovered in a comparatively short time.

10. Treatment was discontinued in 4 per cent. of cases for the following reasons:

a. Too early administration of the drugs; *b.* disproportion between fetal head and pelvis; *c.* cessation of labor pains; *d.* marked alterations in the fetal heart sounds; *e.* repeated injections without any apparent effect.

11. There was no maternal mortality which could possibly be ascribed to this treatment.

12. Labor was terminated in primiparæ by the use of forceps in 26 per cent. of the cases. However, fully 80 per cent. of these were low forceps which merely required lifting the head over the perineum.

13. A general anesthetic was used during the stage of expulsion; and in most instances, chloroform was the anesthetic of choice. Ethyl chloride, ether and somnoform were also used.

14. Seventy-eight per cent. of babies cried spontaneously; 16 per cent. were born oligopneic and required active resuscitation; 3 per cent. were born asphyxiated; 3 per cent. were stillborn; 12 of these or 1.2 per cent. may be accounted for by well-recognized pathological findings, such as transposition of viscera, (two cases); monstrosities (two cases); macerated fetus, cerebral hemorrhage (autopsy), etc.

Of the remaining eighteen cases or 1.8 per cent. we are aware of a number of instances in which large doses of either scopolamine or morphine, or both were given.

15. The treatment is contraindicated in *a.* primary inertia; *b.* labor associated with hemorrhage; *c.* feeble fetal heart sounds; *d.* multiparæ giving history of short labors.

"Twilight Sleep" has its greatest usefulness in primiparæ, particularly during the first stage of labor where the dilation is progressing slowly.

16. It is the consensus of opinion that amnesia, with varying degrees of analgesia, should be our aim. However, the majority consider that the successful termination of a case depends, primarily, upon the degree of amnesia induced.

17. Most investigators are of the opinion that "Twilight Sleep," in properly selected cases, will become a permanent addition to our obstetric armamentarium. We must, however, realize that the great enthusiasm which was created by the introduction of this treatment may in a measure account for the high percentage of successes.

In addition to this, we must bear in mind that this treatment was carried out by men best fitted for this work under the most favorable hospital surroundings, and it is but natural to expect results that under ordinary circumstances could not have been obtained. What the results would be, if this treatment were administered in the average home by men not especially trained in the practice of obstetrics, may be judged by the isolated reports coming from such sources.

It is, therefore, my belief that it would be unwise to adopt this form of treatment to be universal, because the greatest number of women are still confined at their homes, either by midwives or physicians who have not the time nor the training to practise such a delicate therapeutic measure. However, this should not detract from its value. An analysis of the various reports shows that most investigators are fully agreed that "Twilight Sleep" is devoid of any danger to the mother, and that by constant and careful watching, the dangers to the baby are also eliminated.

Judging from my personal experience extending over a period of fifteen months, and covering a series of over 350 cases, I feel that the value of this treatment, and its acceptance as a recognized therapeutic measure, will depend upon our interpretation of the physiological phenomena produced by these drugs. If we accept the theory that the semiconsciousness, induced by the Gaus's method, prevents the actual perception of pain, although apparently present in all its clinical phases, then labor must be considered painless. Therefore, to refuse to adopt this treatment would be a failure on our part to abide by the trust reposed within us. On the other hand, if the mental state induced does not actually prevent the sensation of pain and the patient is actually suffering, even though pain be modified, then the value of this method will devolve upon the degree of diminution of pain or analgesia, and not upon the want of recollection of pain or amnesia.

Personally, I find it difficult to reconcile the fact that a patient, displaying all clinical evidences of pain, such as crying and groaning, does not actually experience it. However, I am fully convinced that pain, in many cases, is not well tolerated and that this would warrant the adoption of this method in selected cases; more especially in primiparæ of the highly emotional type, and in multiparæ in whom we anticipate a long and tedious labor.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

ACUTE APPENDICITIS IN CHILDREN.

BY

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THE subject of appendicitis is not yet exhausted and probably will not be so long as humanity retains the appendix. Often, writers upon this subject begin their papers with an apology for writing about such a common disease about which it is supposed that nothing has been left unsaid. If one should for a moment think that the discussion of appendicitis is too trite to bring before a medical society one should remember that of all acute abdominal diseases this one claims the most dreadful toll of health and life. One must admit that there is probably more known about this one disease than about any other acute abdominal affection, but, notwithstanding this knowledge, it causes a larger death rate than all other acute abdominal diseases combined. I desire to make the further observation, which is very pertinent, that the diagnosis of acute appendicitis in children is not fraught with fine subtleties nor obscure manifestations, but instead is made from frank and honest symptomatology which is well known and easily recognized in the great majority of patients and that, too, in the early stages of the disease. I do not wish to leave the impression that errors in diagnosis cannot be made, even by the most skilful examiner, but I do mean to say that no other acute abdominal affection is more easily recognized from symptoms which are truly classical in their manifestations. Just so long as the mortality of appendicitis remains as high as it is now just that long will the discussion of this subject be most timely and opportune.

Acute appendicitis in children has not received the close attention in medical gatherings which the subject merits. Recently, in a discussion following a paper on this subject before a large County Society, great stress was laid upon the rarity of appendicitis in

children. Some general practitioners of rather large experience had seen only a few cases. My own statistics during the past three years show that more than 18 per cent. of the operations for acute appendicitis were in children. It is customary to classify all cases of fifteen years old and under as children. The frequency of appendicitis in children varies in the reports of the hospitals from 10 per cent. to 20 per cent. with an average of 15 per cent. as a general rule. If our statistics may be considered as of value, the incidence of appendicitis in childhood is greater than our reports show rather than less as we see practically none but those patients in whom the process has gone to pus formation.

If only those patients who have passed into the stage of pus represent a similar ratio as in adults the relative percentage in children is probably quite a good deal above 18 per cent. as shown by our statistics. I attribute the large number of pus cases in children to the failure on the part of the attendant to make an early diagnosis and, also, to the fact that appendicitis in children approaches the pus stage much more rapidly than in adults.

Diagnosis.—There are cases on record as early as the fifth week(1) in which the appendix was acutely inflamed; Dixon(2) reports a gangrenous appendix due to incarceration in a hernia as early as the twenty-fourth day, but this should not be included under the term appendicitis as it was not inflammatory. Lilienthal(3) reports a gangrenous appendix at three weeks, but this was in a hernia, also, and like the case of Dixon's should not be included among cases of acute appendicitis as some writers have done as it was most certainly not a disease of the appendix *per se*. Many writers have reported a number of patients during early infancy. For a review of these cases an article by H. C. Deaver(4) is worthy of perusal. McCosh(5) has reported 1000 cases of appendicitis in children and gives the incidence as 1.7 per cent. in children up to five years of age. The youngest patient of mine was eighteen months old; I have operated on several under five years of age and quite a number under ten years. In every single instance these little fellows were brought in with abscess or with peritonitis and a disease duration of from five to fifteen days. I have never been called to an infant with an early appendicitis and rarely to a child under fifteen years before pus formation, or spreading peritonitis. I wonder if the experience of my surgical friends is similar to mine? Carefully taken histories lead me to believe that if appendicitis had been suspected these cases would have been correctly diagnosed early in the disease. Although the early symptoms may be masked and thus easily mislead one

unless one is alert, the question of diagnosis presents no special difficulties if the fundamental principles of abdominal diagnosis are kept in mind. Those who have written upon this disease have frequently spoken of the difficulties of diagnosis as if they were inherent in the pathological manifestations in children and thus different from the diagnosis of the same disease in adults. I do not think so. The difficulties of diagnosis are more those of oversight than of any real differences in symptomatology. Too, one must not forget the fact that there are some possible minor differences in the symptomatology, but these are of small significance and do not affect the fundamentals of abdominal diagnosis.

There are two main pitfalls in diagnosis: The first one is that children are subject to so many acute abdominal affections which are accompanied by fever, pain, nausea and vomiting as marked symptoms and which are frequent in occurrence and mild in nature; so, that unless one is very watchful one may consider the illness as one of these others until *late* in the disease, or one may fail to recognize the true condition until it becomes serious. The other pitfall is that children do not localize painful areas, unless the peritoneum is involved, with distinctness when asked about them and, therefore, do not give a suggestive history. The adult will often relate a perfect history of appendicitis without the surgeon's asking a single question; but, in the child the physician does not have the aid of this valuable information and must rely solely upon his findings without a history except the fragmentary one which the mother gives. It is so natural for the family to find some adequate cause for the illness in some indiscretion in diet or conduct of the child that the physician is frequently misled by well meant aid on the part of the family. The history of the sequence of pain, tenderness and rigidity, so valuable in the adult, is generally not obtainable in children, except in those near the upper limit of childhood. Often, too, long before the physician has been called, the family has given medicines which obscure the real condition to such an extent that another obstacle is interposed and the diagnosis made more difficult. Then, too, there are certain anatomical conditions present in most children, which may produce slight variation in symptomatology from that seen in adults. Among these may be mentioned that the omentum is shorter in children and the appendix is longer and larger and has, in addition, a shorter mesentery which frequently produces acute bends and kinks in the appendix; the colon has often not descended in children as in adults and thus the appendix will be situated higher; or, the long appendix, with normal position of the cecum, may be in

the pelvis and the symptoms may not localize in the usual area at all. In infancy the pelvic cavity is not differentiated from the abdominal cavity as in adults according to Campbell(19). This takes place after walking begins. Often, bladder symptoms, as Churchman(6) has shown, are the most prominent and may be the only ones present in cases of mild appendicitis. He urges a rectal examination in all children with bladder symptoms associated with abdominal disturbance. Inflammations of the peritoneum in children do not have the protection of the omentum as in adults and, therefore, generalized peritonitis is more frequent and occurs much earlier than in adults; this frequently misleads the attendant because the rapidity with which the abdominal disturbance advances without any localizing process is unlike that seen in adults. The child may present all of the symptoms of a general peritonitis on the first visit of the physician within the first twenty-four hours of the illness, whereas such a rapid process in adults is exceedingly rare.

History.—Unfortunately, in children under ten years of age it is often quite difficult to get a connected and direct narrative of the onset of the first symptoms and still more difficult to secure it with the sequence of the onset of symptoms. As a general rule, appendicitis in children is not very different from that in adults except in the rare case. In some patients, the whole course and symptoms may be entirely unlike the type in the adult, or they may not simulate appendicitis at all. Churchman(6) states "that appendicitis of the severest type may exist without one of the classic symptoms." H. C. Deaver(4) says that "the symptoms of acute appendicitis in infants are unquestionably scanty, irregular and misleading, and it undoubtedly follows that infantile appendicitis is more frequent than is generally believed, or than statistics show." Fowler(7), in an article reporting 500 cases of appendicitis in children, on the other hand, says that "I am impressed with the belief that the diagnosis of appendicitis can be made in the majority of cases with a fair degree of certainty before the disease has advanced sufficiently to cause pain in the right iliac fossa." I think that in the great majority of the cases Fowler is correct, but in a small number H. C. Deaver is correct; so, that it is well to be overcareful about the obscure cases. Deaver makes the further observation that in very young children the onset is often more obscure, while in older children the diagnosis is generally easier than in adults, as the symptoms are more frank and definite. I am rather sure that in my personal experience the diagnosis could have been made earlier had the attendant been suspecting appendicitis. In only a very

few patients was the diagnosis obscured by misleading symptoms. The history of the onset is usually that of pain as the first symptom; the pain is generally not very acute and is more often described as colic. At a varying interval of time, the child complains of being sick and begins to show other evidence of illness. Nausea and even vomiting may follow and later fever generally comes on although this may be a late occurrence. Fever may be very high from the very beginning, or may be slight, or none at all. Childhood is subject to erratic febrile disturbances. Often the attack is preceded by a history of indiscretions in diet and the physician may be misled by the symptoms being those of the early phases of acute indigestion or those of a beginning acute infection, such as gastroenteritis, etc. A history of previous attacks of colic, or painful gastric disturbances, with or without fever, nausea or vomiting, may furnish a clue to the correct condition.

A history of localized pain and tenderness will not be clear as a general rule for children do not differentiate painful areas; about all that they will say is that the abdomen is painful. Often after the pain has come on these little fellows will get up and go about the room, whereas adults will remain quiet in bed so long as there is the slightest pain present. The child who has escaped a laxative before the physician has called is among medical rarities; the mother has cured so many simple indigestions with oil and paregoric that nearly every case of appendicitis has been given this treatment before a doctor is called. This frequent, but most dangerous, procedure, has converted many mild cases of appendicitis into violent and fulminating peritonitis. The bowels may have been constipated, or they may have been very loose. In my experience in infants the majority of the patients have first had frequent bowel movements before laxatives were given. However, most writers claim that constipation is the rule. In some few cases there may be nothing more than a bladder disturbance with fever and nausea to guide one in making a diagnosis. The average attack of appendicitis in a child is just as easily diagnosed as in the adult as the symptoms are identical in practically every manifestation. So much for the history.

Physical Examination.—This is somewhat more difficult and requires more caution and tact to elicit the true condition than in the adult. Many children are suspicious and afraid and, consequently, do not permit perfect freedom and ease during the examination. The surgeon should not begin to examine the abdomen until he has the confidence of the child and the younger the child the more

necessary it is to secure this quiet and calm in the patient. Very important signs and symptoms may be overlooked by a hasty examination. After a very careful history has been taken, the examiner should search for areas of abdominal tenderness and muscle rigidity. Often this can be strongly suspected by the attitude of the patient in bed, or by efforts on the part of the child to protect a painful area. I have found that children with even the slightest acute involvement of the *peritoneum* protect the abdomen much more carefully than adults; they lie on the bed in a fixed position either on the back or on the side with the legs drawn up so as to relax the abdominal muscles. When the surgeon begins to examine the abdomen the child will, involuntarily, reach out with the hands, or flinch or seize the surgeon's hands if even the slightest inflammation of the peritoneum is present. Often, when the child is restless or crying or frightened it is very difficult to elicit abdominal rigidity; but, with patience, it is an easy matter eventually to find out the true condition. I have often seen children who were apparently so rigid that the entire abdomen seemed to be inflamed, but by gently holding the warmed hand on the abdomen gradually the muscles would relax and the localized areas of stiffness could be found with ease. Between breaths, when there is no inflammation, the muscles will relax, but when there is inflammatory rigidity the stiffness is constant. One point of great importance is that tenderness and rigidity in any part of the abdomen in a child points conclusively to localized peritonitis which, in the great majority of cases, means appendicitis. This is much more the case in children as they have practically no other involvement of the peritoneum than from disease of the appendix. It is true that children do have salpingitis, cholecystitis, perforated gastric ulcers, etc., but with such great rarity that they are to be considered only in the exceptional patient and when present the history will possibly suggest their presence. Do not look for the classical location of appendicitis in children with the same regularity as in adults, for this has been the stumbling block to not quite a few of my medical confrères; but, when tenderness and rigidity are found the diagnosis can be made with great assurance provided the history of the illness bears out the findings. When the appendix is located in the pelvis, which is often the case, due to the long appendix and to the low position of the cecum, which is likewise frequently present, there may not be the slightest rigidity of the abdominal muscles and tenderness only on deep pressure down into the pelvis. For this reason, rectal examination is very necessary in all cases of suspected appendicitis when the usual signs of perit-

oneal irritation are absent. This examination should never be omitted in doubtful cases especially if bladder irritation is also present. The finger will find the tenderness and rigidity with ease as the child's pelvis is shallow and easily palpated in its entirety. More often in children than in adults the cecum has not descended and the appendix may be anywhere in the abdomen. In some cases the only rigidity will be in the loin behind and the other areas of the abdomen may be free from any tenderness or rigidity. Percussion will be of slight value except in those cases which have gone on to abscess formation, but by this time usually there is very little question of the diagnosis. With pain, vomiting, tenderness, rigidity in any part of the abdomen and fever, the diagnosis of appendicitis can be made with much certainty. As in the adult, the temperature and pulse rate have only a relative value; in children acute gastroenteric infections are so frequent that they must always be thought of and duly considered before arriving at a conclusion.

When considering the resistive power of the patient, the temperature and pulse rate have a great bearing—probably more than in adults. High temperatures are frequent and a rapid pulse is normal with any serious ailment. Vomiting is natural in childhood and comes on easily, but in appendicitis it soon ceases until the advent of peritonitis, when it returns and is always to be looked upon as a bad omen. Frequent examinations should be made so long as the diagnosis is in doubt because operation is more urgently demanded in children as diffusing peritonitis sets in more readily and progresses more rapidly as the omentum, the great safeguard in the adult, is not well developed in infancy and but poorly protective in older children. Distention comes on after the classical signs have existed for some time as a rule, but so often appendicitis follows an earlier gastrointestinal disturbance, in my experience, that it may precede the onset of peritonitis. Respiration is normally abdominal in children and when it becomes costal strong suspicions of appendicitis will direct the examiner to more careful attention to the underlying cause of the trouble. Crying and restless children present great difficulties to the physician, but patience and tact will overcome them. H. C. Deaver⁽⁴⁾ quotes the epigram that "all cases of abdominal trouble in children are appendicitis until proved otherwise."

Differential Diagnosis.—In childhood there are quite a number of morbid conditions that may confuse the surgeon which are not so frequently encountered in the adult. Probably, one of the very best of classifications is to divide the diseases which may confuse into

those which arise above the diaphragm and those which arise below the diaphragm. This simplifies the subject materially and serves as an aid to the examiner when kept in mind.

(a) Those pathological processes arising above the diaphragm which present abdominal symptoms likely to confuse are acute pneumonia and acute pleurisy. Recently, a child was brought in for an acute abdominal condition, or as Battle(8) would say "with an acute abdomen," which presented all of the symptoms of localized pain, muscle stiffness, high temperature, rapid pulse, quick respiration, nausea and vomiting, distended abdomen, with a history of a rapid onset and marked prostration. A careful physical examination located an early pneumonia in the left lower lobe with coincident pleurisy. Operation was not done and the disease ran the usual course terminating in empyema necessitating rib resection later with final recovery. The differentiating features in this particular patient were that the rapid breathing suggested a possible lung involvement and deep pressure over the abdominal area of greatest tenderness and rigidity relieved rather than augmented the pain, whereas if inflammation had been present in the abdomen deep pressure would have increased the pain and the child would have shown it in no unmistakable manner. Over the lower lobe of the left lung were heard many fine rales and sharp pleural friction sounds. Dulness and increased vocal fremitus were in evidence. A medical consultant was called who declared that the child was suffering from some acute abdominal affection, but he readily retracted when his attention was called to the lung findings. It has been my misfortune to overlook at least one of this nature and since then I have been on the alert; fortunately, my patient recovered from both the operation and the pneumonia. The examination of the lungs should never be neglected in children when an acute abdominal condition is presented and to operate upon a case of pneumonia deserves censure unless the pathological process is so obscure that it cannot be determined by a careful examination. I operated upon one such patient—a strong young man, who twenty-four hours later developed a frank, but mild, pneumonia in the right lung. The determinative factors in pulmonary conditions, which give abdominal symptoms, are generally easily diagnosed by ordinary physical examination and when once suspected should not mislead the surgeon. Various explanations have been given as the reason for the referred symptoms and I shall review them briefly.

In 1891, McKenzie(9); while studying a patient suffering from gallstone colic, observed that the skin covering the upper part of the

abdomen and the lower part of the chest was quite tender on the right side. This observation led him to investigate referred pain in diseases of the viscera, especially cutaneous sensation. He found this phenomenon quite constant and in 1892 he published his observations. Later, Head(10) published similar observations and since then McKenzie has developed his doctrine of viscerosensory reflexes. McKenzie found that not only the skin would give a viscerosensory reflex but also the deeper structures such as muscle, etc., would give them. He divides the referred sensations into superficial and deep; the deep sensations are always present when the superficial sensations are present, but the opposite is not true as there may exist deep sensations when the cutaneous are absent. This doctrine of viscerosensory reflexes explains the abdominal symptoms of acute pulmonary and acute pleural pathology. Capps(11) made a very interesting series of observations upon referred sensations, or viscerosensory reflexes, upon the pleura when irritated. He studied the pain distribution by scratching the pleura in patients suffering from effusion with a long blunt wire inserted through a needle. He found that pressure exerted on the pleura caused pain in referred areas and not locally. His studies demonstrated that the outer portion of the pulmonary side of the diaphragm caused pain in the distribution of the dorsal nerves ranging from the sixth to the twelfth and was felt in the flank, abdomen or on the chest. Also, it was shown that the distribution of these painful sensations was constant. Griffith(12), in an article on "Pneumonia and Pleurisy Simulating Appendicitis in Early Life" lays stress upon the frequency of abdominal pain which may simulate acute appendicitis. In this paper he quotes from the literature but gives no rational explanation of the cause of referred pain in the abdomen. Herrick(13), however, does give an explanation which quite well satisfies according to the modern studies of the nerve distribution; he speaks of the dorsal nerves from the sixth to the twelfth as being the ones which supply the diaphragmatic pleura close to the costal attachment and that the pain felt in the abdomen is a true referred pain. Griffith, in summing up his conclusions, makes the following sensible comments: The distinction (between lung conditions and appendicitis) is to be made by giving due consideration to (1) the sudden rise of temperature to 103° F. or thereabouts, and a tendency to maintain this degree; (2) the acceleration of respiration, which is out of proportion to the pulse rate or the pyrexia; (3) the relaxation of the abdominal walls between respirations; (4) the diminution or the disappearance of tenderness on deep pressure with the flat of the

hand; (5) the possible presence of cough. All of these points will, however, frequently fail to make the diagnosis certain.

Herrick (*loc. cit.*) says that the abdominal pain in acute diseases of the diaphragm may remain for a few days and then disappear. This has been my experience in the few cases which I have treated and this has been noted by other writers. If the above explanations are correct, pain and tenderness in the abdomen in pleurisy and pneumonia is present only in those patients who have involvement of the outer portion of the diaphragmatic pleura which portion only is supplied with nerves that pass onto the abdomen. Herrick's conclusions bearing upon this subject are very interesting and will be given in brief: The *visceral pleura* is not endowed with pain sense; the *parietal pleura* is richly supplied with sensory fibers from the intercostal nerves. Irritation of the pleura induces sharp pain that is accurately located by the individual over the spot that is touched and never gives rise to referred pain; the *diaphragmatic pleura* derives its sensory supply from two sources, the phrenic nerve and the last six intercostal nerves. The central portion of the diaphragmatic pleura is innervated by the phrenic nerve; a rim 2 or 3 inches wide peripherally is innervated by the sensory fibers of the intercostal nerves and irritation of these gives rise to pain in the lower thorax, in the lumbar region or in the abdomen. The pain is spontaneous and is associated with hyperesthesia and hyperalgesia of the skin and superficial tissues on pressure. The more intense the irritation of the pleura, the greater the tendency of the pain to spread down over the lower abdomen. Dexter(14) confirms the studies of those quoted above and his paper is well worth reading although he lays no stress upon referred abdominal pain.

(b) Of those diseases which arise below the diaphragm DeForest Willard(15) gives more than twenty which must be duly considered when making the diagnosis of acute appendicitis in children; he quotes Spellissy(16) who mentions sixty-eight lesions that should be kept in mind when examining a patient. While it is true that the above quoted writers are correct in their statements as to the wide possibilities for error, it is also true that there are in reality only a very few common ailments which are usually met and which are liable to confuse. Among those common ailments most frequently encountered below the diaphragm are the usual digestive disorders and the acute infections involving the intestinal tract. Acute indigestion may be easily mistaken for the early symptoms of appendicitis as the symptoms of vomiting, pain and fever may be present in both; in appendicitis *vomiting follows the onset of pain*,

whereas in indigestion *pain follows vomiting* as a general rule. The history on this point is often inaccurate and, therefore, is of small value. In appendicitis vomiting is rarely prolonged as it is in acute digestive disturbances. Fever in children is peculiar and erratic and is subject to wild variations and is, therefore, of minor diagnostic import; however, as a general rule in appendicitis it is somewhat lower and more in keeping with the abdominal findings. While there may be distention and soreness in any of the acute gastric disorders, in acute appendicitis these follow a well-defined course and are constant and progressive; there is never a *fixed* muscular protection, even though the tension may be the same, in acute digestive disturbances as there is in acute appendicitis. It is more of a general soreness arising from inflamed *mucosa* rather than the definite and sharply defined tenderness of acutely inflamed *peritoneum*. There is never the board-like hardness which indicates peritonitis arising from the appendix. The child will permit a careful examination in acute gastric conditions, whereas in acute appendicitis with apparently the same amount of local trouble it will submit to examination with every evidence of doubtful consent. This is a factor of some value when in doubt, I am sure. Constipation is the rule in appendicitis according to many authorities, but in my experience this symptom has little value; in acute gastrointestinal diseases frequent bowel movements, if not diarrhea, are the rule. Localization of rigidity and tenderness and even pain are practically never present in other acute abdominal complaints of children whereas in acute appendicitis such is the rule and is a diagnostic point of extreme value in determining a *late* sign of appendicitis. One must not overlook the fact that in children much more than in adults the focal points of appendicitis are not always in the right side as a recent case will demonstrate. A seven-year-old girl was brought in with localized pain, muscle rigidity and tenderness on the left side corresponding to McBurney's point on the right side; all of the other diagnostic features of appendicitis were present as shown both by the history and the physical examination. No hesitancy was evident in declaring the disease to be acute appendicitis. Operation disclosed an appendix with an abscess in the tip exactly under the area of local symptomatology although the cecum was in its normal location.

Acute or chronic ileocolitis and allied diseases should not seriously confuse the careful examiner and they will not be discussed in detail as their symptomatology is of common knowledge.

It is possible for acute infections of the gall-bladder to be met

with, but their symptomatology is not different from that seen in the adult, except the common difficulty always to be encountered when examining a sick child. Tact and patience will overcome these difficulties. In girls one must never forget to keep in mind the possibility of adnexal diseases, such as salpingitis, tubercular salpingitis, gonorrheal infections, etc.; but, if the history is taken with caution, these need not present serious difficulties. Intussusception and intestinal obstruction may simulate appendicitis, especially if fever be present from these conditions, or from some other cause.

Blood examinations should always be made in doubtful cases, but their value is lessened by the fact that leukocytosis is frequent in all acute infections of childhood. When considered with all the other clinical findings the blood examinations have about the relative value as in adult patients. I do not think that one is ever justified in permitting the blood examination alone to determine the question of operation; the entire clinical picture, from the onset of the earliest symptoms to the moment of examination which must include the history, the physical examination and the laboratory findings, must be most carefully valued before deciding the diagnosis. Smith(17) has made the interesting observation that the abdominal cutaneous reflexes are uncertain in children under three years of age, but they are very active in childhood and in acute appendicitis "an involvement of the reflex of the lower right quadrant has almost always denoted a fairly well-localized inflammatory process. He makes no great claim as to the value of the loss of the reflex, but when absent, he believes that it is of corroborative value. It is not uncommon to see children with peritonitis," but careful inquiry can nearly always elicit a history strongly suggestive of appendicitis. Pneumococcic peritonitis does occur more often in children than in adults, but it is better to be rather chary about making such a diagnosis until one is positive that a more dangerous pathology is not present for it would not be so grave an error to operate upon a child suffering from pneumococcic peritonitis as it would be to neglect operation in a case of acute appendicitis.

Particular attention should be paid to any child suffering with disturbance of the bladder, such as painful and frequent urination, or more especially retention, as often this is the one symptom upon which to rely in appendicitis when the appendix is situated in the pelvis. In such patients there will be very frequently absence of muscle stiffness and local tenderness, except upon deep pressure. Rectal examination will disclose the presence of tenderness and any localized process. Recently, a three-year-old girl was sent in with

a large tumor of the lower abdomen; she had regularly passed the urine according to the statements of the parents; her temperature was subnormal, the pulse rate quick and feeble; she had vomited almost constantly and shortly before coming in the vomitus was dark brown and smelled of bowel contents; the bowels had moved after administration of excessive doses of oil and calomel. The blood picture was negative. Rectal examination disclosed nothing of value. The whole situation was so obscure that the diagnosis was reserved. The catheter removed 16 ounces of urine; there was atony of the bladder requiring the catheter for several days. Later, the attending physician found out that she had been poisoned by large doses of "phenolax wafers."

Treatment.—In the great majority of all cases of appendicitis in children some form of family medicine has been given before the physician has been summoned, and unless the physician is very alert and the case an outspoken one, all will have had a laxative and many a drastic cathartic. This is due to two things, namely, the great frequency of acute infections and gastrointestinal ailments in which this form of medication is the correct line of procedure and to the great similarity of the early symptoms of appendicitis to the above diseases. The relative seldom occurrence of appendicitis contributes to an occasional oversight by the physician. Laxatives are distinctly contraindicated and should never be given; even when appendicitis is merely suspected, time should be taken in which to clear up the diagnosis before resorting to laxatives. Developments in physiology during the last few years have made clear the harmfulness of laxatives in appendicitis. It has been demonstrated that the normal peristalsis in the cecum and as far as the middle of the transverse colon, is toward the appendix until all food products are prepared for entrance into the stage of hard feces. In the cecum the water is absorbed and the remaining food undigested is finally disposed of, excepting very small quantities which are taken up in the distant parts of the colon.

The peristalsis toward the cecum is rather violent and continues until the ascending colon is empty. Laxatives send food products along the intestinal tract and keep the cecum and ascending colon full and tense which develop waves of antiperistalsis(18). The musculature of the appendix is a continuation of that of the cecum and any movement originated in the cecum is transmitted to the appendix. This recurring activity of the cecum with the violent writhing of the appendix during these waves will tend to invite rupture and to spread inflammation and it will, in addition to the

damming up of material in the appendix itself, especially in children as the cecal end is usually quite wide and often funnel shaped, increase intraappendiceal tension with its attendant dangers.

If nausea and vomiting are present and continued, which occur only after peritonitis has supervened, gastric lavage is invaluable. With great pain and tenderness ice applications will often relieve, but if this fails heat may do better in some patients. An enema in order to relieve the colon may be given provided it is a small one and no pressure is used as otherwise antiperistalsis may be started with all of its evils. Constipation does not have all the evils which the family physician may attribute to it; the effort to overcome constipation in acute appendicitis has sent thousands to an unnecessary grave. The temperature is rarely of sufficient height as to require attention. In reality, there is no medical treatment for appendicitis in a child any more than there is in the adult, but many cases have to be watched until the diagnosis can be made. Then, there are cases, which for various reasons, will not submit to surgical measures and, therefore, must have medical treatment during the entire time. It is for these patients only that there is a medical treatment.

When the diagnosis has been made it is proper to relieve pain by appropriate doses of some opiate if other measures fail and not before. I know how widely surgeons differ about the use of this one drug in appendicitis, but I have no hesitancy in relieving pain with morphine *after* the diagnosis has been made and operation refused. If operation is permitted no time is lost in getting this done; but if it is refused, unrelieved pain will do infinitely greater harm than opiates used with discretion in case other measures have failed to make the patient comfortable. In fact, I am not so sure but that the constipating effect of opium producing intestinal calm is not beneficial in those who will not submit to operation. Apparently, the Fowler position has lost vogue recently as have many other doctrines founded upon mistaken physiological ideas; however, it might be well to elevate the head of the bed. "Rectal drips" are not always well borne by children, but when taken kindly they are apparently valuable. No water or food should be given to these patients except in rare instances. Often in young children in whom the "drips" are badly borne, water in small quantities frequently will allay their craving and do less harm than if they were permitted to beg constantly for it. Gastric lavage does not have the place in the treatment of peritonitis in children that it has in adults.

Every child with acute appendicitis should be operated upon if seen early; this means before the inflammation has spread beyond

the appendix and has rather loose reference to the number of hours after the attack has begun. The "hour period" has done great harm, for pathology does not heed time in its processes. Some cases are hopeless within a few hours; others have recurrent attacks for years and finally get well. Often patients are taken to the surgeon with great distention and a rapid pulse, spreading tenderness and general muscle rigidity, with more or less cyanosis, rapid respiration and all the evidences of septic absorption. To operate upon such a case is to invite disaster; many more will get well by the treatment outlined under medical measures. Between these two extremes are often met patients with localized processes with every evidence of an abscess or at least of local peritonitis without spreading. These should be operated upon only when the general body resistance is good; if an abscess is walled off it is safe and easy to drain and to get the appendix if readily accessible, but if the appendix is difficult to locate or if it forms a wall of an abscess it is best to leave it and to take it out later after the antibodies have fortified the patient against infection. It is simply surprising how well the patients withstand secondary removal of the appendix even though pus is still in the wound. The cardinal principles of abdominal surgery in children are short operation, a small amount of handling of tissues, and drainage when infection is present.

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TRANSACTIONS OF THE AMERICAN MEDICAL ASSOCIATION.

Sixty-fifth Annual Session.

San Francisco, June 22-25, 1915.

SECTION ON DISEASES OF CHILDREN.

LAWRENCE T. ROYSTER, M. D., *Norfolk, Va., in the Chair.*

CHAIRMAN'S ADDRESS.—THE PEDIATRICIAN AND THE SECTION ON DISEASES OF CHILDREN.

DR. ROYSTER traced the development of pediatrics from a comparatively unimportant branch of medicine to its present status and predicted that the pediatrician now stood on the threshold of a new era. A generation ago the care of children was delegated to the old woman nurse; and from her methods to those of the pediatrician of to-day was certainly a far call. The requirements of a competent pediatrician to-day were many. He needed a liberal education, general and medical, experience as an interne in a children's hospital, surgical training, and expertness in microscopical work. But, in addition to this special knowledge, he should be a leader of thought in his community, and must be able to speak with authority on all matters pertaining to child welfare and the prevention of disease. He should make his influence felt in the city council chamber, on the board of education and in all lines of sociological endeavor; indeed, a thorough knowledge of sociology in all its bearings was most important. It was important that the pediatrician should be an alienist also, for it had been shown that the child that was mentally abnormal was always less resistant to disease than other children, and there seemed to be an ever increasing number of this class. To keep abreast of the times and fully acquainted with the best thought required constant study and practical post-graduate work at frequent intervals.

This Section on Diseases of Children should be the clearing house of the entire country of the best work done in pediatrics each year and its utterances should eventually become recognized as authoritative by the general public as well as by the medical profession. The best papers presented at these meetings should be selected for pamphlet distribution and such as were practical and suitable should be given a wide publicity through the daily press. In order that material might be thus utilized a careful censorship should be exercised over all papers presented.

Again, it would be well if this Section would appoint a committee to cooperate with the Child Welfare Bureau of the general government, with the American Association for the Study and Prevention

of Infant Mortality, and with the several state boards of health, in the study of the causes of infant mortality and the best methods of combating the high infant mortality rate.

Dr. Royster suggested that it might be advisable to recommend to the American Medical Association that it establish a Council on Infant Mortality and Morbidity which should undertake the direction of child welfare work in an authoritative way throughout the country.

In closing Dr. Royster stated that any body of men who were striving to better the race physically and to raise to a higher position the growing members of the human family could not possibly have too high ideals or be too well equipped for the service which they had undertaken.

RECENT METHODS OF TREATING DIPHTHERIA.

DR. FRANK C. NEFF, Kansas City, Mo., read this paper, in which he first summarized the work of Shick and W. H. Park with reference to the Schick reaction, and then reported the results in 155 cases of diphtheria treated with diphtheria serum in the Kansas City General Hospital. Of this series three cases were under twelve months of age; forty-six from twelve months to five years; forty-seven from six to ten years; seventeen from eleven to fourteen years, and forty-two over fifteen years. The mortality for the entire series was 5.8 per cent. In the fatal cases the first dose of serum was administered on the third day on the average. In the fatal cases the average of the first dose was 6100 units of antitoxin. In a general way it had been quite universally accepted that diphtheria should be diagnosed and treated at the earliest possible moment. That much time was lost was shown by the condition of their patients at the time of admission to the hospital. Four of nine deaths occurred within twenty-four hours from the time of admission. In cases in which the intravenous injection was used practically the same number of units was employed for the mild as for the severer cases. The average milder cases received 6000 units. In order to avoid delay in the treatment of children having diphtheria, the essayist suggested that municipal health boards and hospitals extend their emergency service to include immediate distribution and collection of swabs and culture tubes in order to make possible the administration of the serum within twenty-four hours. As intramuscular injection of the serum gave more rapid and efficient results and was as easy of administration as the subcutaneous there was no reason why the subcutaneous method of making the injection should not be abandoned. The intravenous injection gave less discomfort and there was no contraindication to its use unless there might be difficulty in finding a vein. In the series of cases reported there were twenty-four instances of serum sickness.

They had tested eighty-one children by the Schick method. Of sixty-five infants under five months of age only one reacted to the diphtheria antitoxin. There was evidence that the reaction of the

individual to the test might change from time to time. The finding of a negative reaction shortly after exposure to diphtheria was of practical value as an index to that individual lack of susceptibility at that time and made unnecessary any prophylactic injection of serum.

DISCUSSION.

DR. JOHN ZAHORSKY, St. Louis, said that they had had an epidemic of diphtheria in St. Louis last winter in which the cases were the most toxic he had ever seen. He had found that the intravenous method of administering the antitoxin was not always practical on account of the reaction, and because in many instances parents were very much alarmed about it, but in severe and neglected cases the intravenous method was the one to be adopted. As to the relative advantages of the intramuscular and subcutaneous he was not quite decided which was best. In some cases of moderate severity he had noticed a furious increase in the growth of the diphtheritic membrane for a few hours after the administration of the antitoxin and he wondered whether the intramuscular injection would stop this rapid spread any better than the subcutaneous injection.

Frequently the antitoxin on the market seemed to have small particles in suspension and there might be danger from its use; there ought to be some method of filtering it. If the circulation was good and the pulse good and there was no lymphocytosis, the subcutaneous method was preferable, but if the circulation was poor and the limbs cold it was better not to depend on it, but to use the intravenous.

DR. LANGLEY PORTER, San Francisco, asked Dr. McClanahan what his results with the Shick reaction were with reference to sloughing and what results he had in laryngeal diphtheria with the doses of antitoxin he gave.

DR. A. A. O'NEIL, San Francisco, said that the paper did not agree with his experience with diphtheria in San Francisco. Here the cases were not recognized so early and many children were moribund when first seen. In the class of cases they were meeting with the small doses of antitoxin advocated by Dr. Park and others did not seem applicable. In laryngeal diphtheria he gave 60,000 units at the first injection and had repeated it up to 300,000 units and the cases had been saved. Even with the large doses they were giving the mortality reached 12 to 15 per cent.

As to anaphylaxis, he had seen it in but one case.

DR. HENRY DWIGHT CHAPIN, New York, thought it was unsafe to argue from what they found in institutional cases that the same thing would be true in private practice. He had tried both large and small doses of antitoxin and did not think the very large doses were necessary. In institutional work one was apt to get late and bad cases much more frequently than in private practice. Dr. Chapin did not think it wise to let the statement go forth that they favored such large doses as had been mentioned.

DR. JESSIE MCGAVIN, Portland, Ore., agreed with what Dr. Chapin had said, that it was not necessary to give such very large

doses of antitoxin. In the clinics of Vienna they never gave the very large doses that had been given here in America, not even in cases of laryngeal diphtheria.

Dr. McGavin asked if anyone present had had any experience with Vincent's angina. She said she had had cases that looked like diphtheria of the tonsils, uvula and pharynx, and she wondered if such cases would clear up under the administration of antitoxin.

DR. JOHN A. COLLIVER, Los Angeles, said that in speaking of the Shick test nothing had been said regarding the pseudoreaction. Attention should be called to the fact that there was such a thing as a pseudoreaction that might be mistaken for the true reaction unless one understood the difference. In Professor von Pirquet's clinic they were making the Shick test by means of a drill similar to that used in making the von Pirquet test, which eliminated the pain incident to the ordinary Shick intradermal method.

DR. W. W. BEHLOW, San Francisco, disagreed with Dr. Chapin and Dr. McGavin and agreed with Dr. O'Neil on the subject of the dosage of antitoxin. He had observed the disease in both San Francisco and in Boston. In Boston the small doses were used for years and they did not bring the results that had been shown since they had been using the larger doses in more recent years. They found that the children were not being saved by the small doses and so increased the doses by 4000 or 5000 units. If the small doses were satisfactory why did they make this change? And again, why was it that the small doses gave good results in the hands of some men, while in the hands of others they did not?

DR. PHILIP S. ROY, Washington, D. C., said Dr. Neff had not made clear when a case of diphtheria was mild. It was possible for the clinical symptoms to be quite mild and at the same time the vital organs might be attacked and the case be in reality a very severe one, or, again, there might be severe symptoms without any involvement of the vital organs. Would one give the same doses to both classes or cases? It seemed to him that the complement fixation test might be taken as a guide to the size of the dose required by the patient; by this test it had been shown that amounts of antitoxin above 20,000 units did not do any good. In his opinion the very large amounts mentioned were not based on any intelligent reasoning.

As to laryngeal diphtheria, the man who first told us about this type of diphtheria was Morrell Mackenzie who described the anatomical condition and told us why there were very few symptoms in connection with laryngeal diphtheria. The larynx was poorly supplied with lymphatics and hence the toxins of diphtheria were slowly taken up and one got few constitutional symptoms. Children with laryngeal diphtheria were suffering from want of air, but not from toxicity.

DR. WILLIAM PALMER LUCAS, San Francisco, said in reference to the pseudoreaction that it appeared within twenty-four hours after the application of the Shick test and disappeared at the end of another twenty-four hours. Some of these reactions showed considerable infiltration but if they disappeared at the end of forty-

eight hours from the time the test was applied the reaction was negative. In some instances in which the reaction was moderate necrosis followed. He had made the Shick test 400 times during the last few months and in 14 per cent. of the cases had had a marked necrosis. There had been no infection due to faulty technic, but large sized blebs had formed which broke down into necrosis. However, they all healed rapidly. In many instances the reaction remained two or three weeks. Dr. Lucas said he had a reaction on his arm at the present time that had been there for three weeks. The Shick test was of great importance in institutions as it eliminated from 50 to 65 per cent. of the children as not being susceptible to diphtheria and thus lessened the work about one-third as one did not have to watch these children so closely.

DR. LANGLEY PORTER, San Francisco, did not think it was right that it should go forth as the sentiment of this Section that small doses of antitoxin were as good as large ones. Before they permitted such an impression to go out they should settle on some minimal amount and determine just what they meant by a "small dose." Dr. Porter said he had been doing the same kind of work that Dr. O'Neil had been doing and was convinced that in institutional cases the large doses were of extreme value. No one had said that large doses did any harm and it did not seem that the sanction of the authority of this body should be placed on small doses. Some amount, say 6000, 8000 or 10,000 units, might be designated, but we should not let it go out simply that we favor small doses.

DR. FRANK C. NEFF, Kansas City, did not advocate small doses but adequate doses, and had said 6000 to 10,000 units. The point brought out by Shick and Park was that an adequate dose should be given as soon as possible and a large one if necessary.

As to the pseudoreaction, it was not mentioned as a pseudoreaction but as anaphylaxis and inflammation that disappeared within a few hours. Shick found that he got some sloughing with the stronger solutions but that with greater dilution he did not get it. In their experience they had had but one case of sloughing in 500 tests, and in that instance the test was made by an interne who had never made it before.

Dr. Neff said he had never used antitoxin in Vincent's angina himself, but recalled one case that was brought into the hospital in which one or two doses of antitoxin had been given but they did not seem to have any effect. He considered laryngeal diphtheria from the standpoint of the stenosis. He had given 10,000 units intravenously and had seen immediate results.

DR. JOHN ZAHORSKY, St. Louis, said that with reference to the extension of the membrane after the administration of the antitoxin, this did not occur if the dosage was adequate or given intravenously.

The patients were frequently uncomfortable in lying down when the injection was given in the back and there was no reason why other muscles could not be selected; one did not necessarily have to make the injection into the gluteal muscle.

PRACTICAL VALUE OF THE EXAMINATION OF STOOLS IN INFANCY.

DR. H. M. McCLANAHAN, Omaha, stated that by inspection of the stools of infants one could obtain a great deal of valuable information with reference to the odor, consistency, color, presence or absence of mucus, blood or curds. However, additional information might be acquired by chemical analysis that inspection did not reveal. By chemical examination one got information with reference to the digestion of fats and proteins which has a practical application in the feeding of difficult cases.

Dr. McClanahan demonstrated this proposition by citing a number of illustrative cases.

DISCUSSION.

DR. JAY I. DURAND, Seattle, disliked to disagree with the reader of the paper, but he thought that in most cases a chemical and microscopical examination of the stools was not a matter of very great importance. A great deal could be learned from inspection with reference to the character of the derangement. In Berlin, with all their attention to keeping careful records and to all the minutiae of a case, little attention was paid to the chemical and microscopical examination of the stools. Rosenstern, when asked to discuss the value of the chemical and microscopical examination of stools in infants, said he felt very much embarrassed that he should be asked to discuss a subject in which he did not believe. Conditions caused by excessive fats or excessive carbohydrates could be recognized by inspection. We knew that bloody stools were the result of infection and not due to inability to take care of any one food element. If starch was being taken in excess we found starch in the stools and if we stopped feeding an excess of starch it would disappear from the stools. If the protein elements were being properly digested, even if there was a small amount of starch in the stools there was no reason for changing the food. Chemical examinations of stools were of value to the man who was making metabolism experiments and studying culture, and bacteriological work was of value to the student, but from the standpoint of the general practitioner inspection is important rather than chemical and bacteriological examinations.

DR. C. G. GRULEE, Chicago, was inclined to agree with the last speaker for the reason that diarrhea was not a condition simply affecting the digestive tract but was essentially a metabolic disturbance, and one could not get much from a chemical and microscopical examination of the stools unless he was prepared to make a very extended examination. He doubted very much if by such examinations sufficient information was gained to repay for the time expended. It had not been his practice to make such examinations as a routine measure.

DR. WILLIAM PALMER LUCAS, San Francisco, agreed with the last two speakers and thought the last speaker had struck the point when he said that the diarrhea was frequently a question of met-

abolism rather than of simple digestive disturbance. From the teaching standpoint a comparison of the results of inspection with those obtained by chemical and microscopical examination was a good thing, since in this way the student got a clear idea of the meaning of inspection, but from the practical standpoint inspection showed just as much and was easier. If the general practitioner after making an inspection was not sure just what condition was present it might be that the laboratory could help him, but this would be for the unusual case, while, as a rule, the physician inspects every case that he handles.

DR. F. W. SCHLUTZ, Minneapolis, agreed with Dr. Lucas that in specific instances chemical and bacteriological examinations were very useful. It was sometimes found that an infant had an intolerance to starch only after the dyspepsia had occurred; by a chemical test for starch if one found it present he would be warned of a beginning dyspepsia and would be able to avoid the trouble by reducing the quantity of starch. This was true also of salts and he believed chemical examination was advisable in many cases.

DR. LANGLEY PORTER, San Francisco, made it a practice to make a routine examination of the stools in every case and while a definite conclusion as to the value of such an examination might be hopeless, it was a fact that after a few months' experience in making the chemical examination one could foretell what would be found by inspection. The think that helped most was the Gram stain if this was accompanied by tests of the reaction with reference to acidity or alkalinity. Even if these examinations were helpful in only a few cases it was worth while making them for those few. The microscopical examination was helpful in cases of infective diarrhea, though they did not get these cases in San Francisco as they did in the East. In infective diarrhea the Gram stain would show an increase in cocci and bacteria and if this condition was coupled with acid stools the indications are for high proteins. If, on the other hand, the stools are alkaline one could kill the baby by feeding high proteins and the baby might be saved by cutting out the proteins and bringing the stools rapidly to an acid reaction.

Dr. Porter thought that in San Francisco they had failed to recognize or to give sufficient emphasis to the fact that there is a condition of true starch indigestion in children older than two years. In older children who do not digest starch well the condition might be due to celiac disease or to pancreatic insufficiency. One of Dr. McClanahan's cases seemed to be of this nature.

DR. JOHN ZAHORSKY, St. Louis, had been interested in stool examinations and had written a paper advocating the testing of curds to see whether casein was present or not. These tests might not be necessary for every child, but in many instances they were helpful in enabling one to find out whether casein or fat curds were causing the trouble. It was important to know whether the reaction was acid or alkaline. Frequently when a man found thin stools he just assumed that he had acid stools and failed to find out just what the changes were. If one finds loose stools and they prove to be acid

one need do nothing more than to take out the carbohydrates. The Schmidt tests for hemoglobinuria were important, and it was well for one to know whether reduction or oxidation was going on and whether bilirubin or hydrobilirubin was present. It seemed that we might gradually accumulate a number of simple tests and in the future find that stool examination was of greater importance than it was now thought to be.

DR. H. M. McCLANAHAN, Omaha, said that it seemed from the discussion that the men who were familiar with laboratory work thought they could gain something from such examinations, and as others became more expert they might find that something more than they now thought could be gained from chemical and microscopical examinations. He had been making these examinations for years and felt that they had been of benefit to him especially in feeding neglected and bad cases. It was rather a surprise to hear the men say that these tests were of no value to the practitioner but were valuable for students. He did not see why they were of value to the student if they were not to the general practitioner. He believed that if they learned to make the examinations they would be led to pay more attention to inspection.

A CLINICAL STUDY OF PNEUMONIA IN INFANTS.

DR. HENRY DWIGHT CHAPIN, New York, said that the hospital treatment of pneumonia in children had been very disappointing. His experience in the Post-Graduate Hospital of New York City, which was located in a densely populated district where promising material could scarcely be expected, had been about the same as that of others in dealing with a similar class of cases. The high mortality from pneumonia in children in hospitals was due partly to the poor general vitality of these children and partly to the fact that many cases were not sent to the hospital until the disease was in a late and dangerous stage. A large proportion of the cases represented secondary or terminal conditions which were apt to occur after any illness in poorly nourished infants. The study presented included fifty cases, twenty-three of which were lobar pneumonia and twenty-seven bronchopneumonia. The mortality among those having lobar pneumonia was 21 per cent. and among those having bronchopneumonia 48 per cent. It has not been easy in all cases to differentiate between the lobar and the bronchopneumonia. When the history of the cases showed a slow inception, remittent fever, or fever not so constantly high with disseminated patches over the posterior areas of both lobes the case was considered as one of bronchopneumonia. In some of the cases both types of pneumonia were present. Hypostatic pneumonia was practically a terminal condition and was not usually recognized during life. It was especially constant in atrophic babies. A notable feature of the series was that high temperature, even up to 105° F. was well borne and that there was a notable leukocytosis in most cases. In some cases not showing high leukocytosis there was a high polynuclear average.

The treatment was stimulating and supporting. The drugs employed were strychnine, caffeine, aromatic spirits of ammonia and occasionally digitalis and nitroglycerine. For quick hypodermic effect camphor in oil and sodium benzoate and caffeine could be depended upon. For cough and restlessness small doses of codeine sulphate might be given according to indications. Drugs should always be given singly.

In the management of pneumonia in infants one of the greatest difficulties was that of securing proper nourishment. Many of these children were already suffering from digestive disturbances due to improper feeding before their admission to the hospital. Special treatment should, therefore, be directed to the digestive tract and this tested the skill of the physician.

Vigorous infants with lobar pneumonia might respond favorably to fresh cold air, but, in the writer's experience, the cold-air treatment was not applicable to the bronchopneumonia of infants, but rather plenty of fresh air delivered into a ward moderately warmed.

If better results were to be obtained in the hospital treatment of pneumonia in infants the patients must be admitted earlier and discharged as soon as resolution has taken place, because if these children were kept in the hospital too long there was danger of reinfection and relapse. It was difficult to avoid secondary and cross infections in weak infants in places where large numbers were collected together. It had been the writer's plan to remove these infants to private homes in the country as soon as acute symptoms had subsided where provision was made for the proper supervision of the children by a doctor and a nurse.

DISCUSSION.

DR. FRANK C. NEFF, Kansas City, was glad Dr. Chapin had spoken of the problem of feeding these infants with pneumonia as the subject was a very important one. He had found that a baby might be doing well before infection with pneumonia, but as soon as the child developed pneumonia he was likely to have gastrointestinal disturbances.

Dr. Chapin's point with reference to fresh air was well taken, but his advice that one should give special attention to the matter of feeding these children with pneumonia was of the greatest value.

THE PROBLEM OF UNRESOLVED PNEUMONIA IN INFANCY AND CHILDHOOD.

DR. WILLIAM PALMER LUCAS, San Francisco, said that this condition was one not infrequently met with in hospital practice. It called for a very careful differential diagnosis as it might be mistaken for a beginning empyema. In order to clear up the diagnosis repeated and very careful Röntgen ray and fluoroscopic examinations were necessary. Sometimes these patients did not recover for months, but if they were treated like tuberculosis patients the majority would recover unless some intercurrent infection intervened.

Dr. Lucas gave an exhibition of x-ray plates and demonstrated the way in which these had helped him in making a differential diagnosis of the condition under consideration.

DISCUSSION.

DR. HENRY DWIGHT CHAPIN said that in pneumonia three things might happen, either the patient might get well, or he might die, or he might neither get well nor die, and it was the latter class of cases that required keenness in diagnosis. In some instances in which the lung did not undergo resolution one would get bronchial breathing and would not get bulging but retraction; one might not get the signs of unresolved pneumonia that were seen in adults at all. One reason that they sometimes failed to get anything by puncture was that they did not use a large enough needle; he had on more than one occasion seen pus obtained with a large needle after failure to find it with a small one.

As to the value of the x-ray in this type of case he felt that it had been somewhat exaggerated. To be of value the x-ray findings must be very carefully checked up with the physical symptoms. The clinician should make the interpretation of the x-ray rather than the röntgenologist.

DR. LANGLEY PORTER, San Francisco, said a most important point brought up in the paper was the value from an etiological standpoint of the dilatation of the bronchi in this condition. Dilatation of the bronchi was almost invariably present in unresolved pneumonia and by its early detection one might by proper treatment prevent a late bronchiectasia. A few years ago Dr. David Edsall called attention to a case of unresolved pneumonia which seemed to have cleared up under the use of the x-ray which had been employed for diagnostic purposes. After reading this he had tried the x-ray in a case that was very slow to resolve and resolution seemed to be hastened by its use. However there seemed to be some evidence that if tuberculosis was present the use of the x-ray hastened the progress of the disease and hence it was not advisable to use the x-ray in the treatment of a case that gave a positive von Pirquet reaction.

DR. FRANK C. NEFF, Omaha, asked if the white blood count had been of any help in making a diagnosis between these conditions. It was very difficult to make a diagnosis in some of these cases and the x-ray pictures should be taken in different positions and sputum examinations should also be made.

DR. J. P. Sedgwick, Minneapolis, said he could not agree with Dr. Chapin that the x-ray should not be interpreted by the x-ray man, but he thought that the pediatrician should also be familiar with x-ray work and then he might get valuable information from the fluoroscopic and x-ray pictures. The pictures should be taken with the patient in different positions. It was very important to know whether one was dealing with an unresolved pneumonia or an empyema, since in the latter condition restraint and proper treatment were very important owing to the fact that operation was to be avoided if possible during the first year.

DR. E. C. FLEISCHNER, San Francisco, was interested in what Dr. Porter had said regarding the clinical use of the x-ray in unresolved pneumonia in children. In several clinics abroad, in Belgium and in the clinic of Dr. Czerny of Berlin, these children were exposed to the sunlight and baked and it was believed that this treatment had a remarkable effect. In one case in which he had tried this treatment it had seemed to be very effective.

DR. WILLIAM PALMER LUCAS, San Francisco, agreed with Dr. Sedgwick as to the value of the x-ray. Of course the x-ray was used mainly in the teaching hospitals, but he believed that the pediatrician should be familiar with the use of an interpretation of the x-ray but that his judgment should not be overbalanced by the report that came back from the x-ray laboratory. He related an instance of a patient in whom the diagnosis repeatedly came back from the x-ray laboratory "encapsulated empyema" but in which he felt sure from the symptoms and signs that it was not an encapsulated empyema. As the child was well able to stand operation, he decided to permit it after the case had dragged on for three months. The operation demonstrated that there was no empyema.

As to the blood picture, the cultures were negative in all cases. The blood counts were above normal. In connection with the clinical picture the blood picture was a relative aid. Dr. Lucas said he had not seen as many of these cases in Boston as he had in San Francisco where there were more bronchial affections and of course more empyemas. In cases in which they could not obtain sputum a puncture might be made and in this way one might get a positive smear. The von Pirquet test might also give help in arriving at a diagnosis. In all of his cases he had made a puncture and taken a culture and he had found the pneumococcus present in many cases. It was also interesting that some of the cases that were punctured in various places were entirely negative.

CRANIOMETRY IN DISEASES OF CHILDREN.

DR. G. HARDY CLARK, Waterloo, Iowa, gave a demonstration of a simple method for the fixation of the head and the adaptation of the caliper for the purpose of securing uniformity in measurements. He stated that any advance in the study of skull development must be based on the acceptance and use of a simple method of measurement. With our present knowledge we could not make any statements as to the value of craniometry in the diagnosis of disease. The craniometric points on the dry skull were very difficult to adjust and to use. It was desirable to have a base line from which to calculate measurements and for this he had chosen the line extending from the glabella to the inion; this met the requirements of craniometry in that it might be set at a definite angle. If it was desirable to establish the facial angle upon a plane parallel to the cerebral base line this could also be done. By means of a lead tape one could make a record of the profile of the skull. This tape was only 1 millimeter in thickness, 1 centimeter in width and 35 centimeters in length. Having established the base line one could find the height

of the cranium above this line at any point that might be desirable, and changes in the height could be noted at any time. It was possible to compare the greatest vertical height of the cranium with the length of the base line and to express the difference in terms of percentage. By this method one could determine the difference between two skulls, as for instance that of a Kaffir and that of a negro. As the skull underwent rapid changes in early life this method would be useful in determining the amount of the changes and should give information of value in the diagnosis of disease and in determining the effect of mental training and character development in healthy subjects. The latter was of considerable importance as the development of mentality and character in a race was coincident with symmetrical cranial lines, and, generally speaking, the occurrence of abnormally sharp curves or flat surfaces appeared to predominate in individuals who were least efficient as factors in social progress.

DISCUSSION.

DR. J. P. SEDGWICK, Minneapolis, said that this subject was one of importance and also one that had been neglected. During the past year Dr. Taylor had been doing work along these lines at the University of Minnesota and they had found that the literature on this subject was very poor.

Dr. Sedgwick related the history of a child which they noticed a few days after birth had a very high vertex, looking somewhat like an oxycephalia. The child also showed a cardiac murmur. This murmur gradually grew worse and the child died at the end of two months. At postmortem an aortic stenosis and a patent ductus arteriosus was found. The stenosis was at a point distal to the passing off of the blood-vessels that supplied the head and the question came up whether the increase in the vertical measurement of the skull could be taken as evidence of other conditions than oxycephalia, acromegaly and hydrocephalus.

DR. C. G. GRULEE, Chicago, had had a case somewhat similar to that cited by Dr. Sedgwick in respect to the oxycephalia but there was no heart murmur. The head had a peculiar crushed-up appearance and there was syndactylism. They thought the case ought to be worked up but found difficulty in getting literature on the subject of craniometry and it was very scant on the subject of skull development. In the study of skull development this paper should be the basis of distinct advance.

DR. HENRY DWIGHT CHAPIN, New York, said that some years ago they thought that data with reference to head measurements would be of value and they had secured an anthropologist who took the measurements of the head and of other parts of the body of the children in the New York Juvenile Asylum. In making a study of their data they found no correlation between skull development and mental condition. Some of the children with the most unsymmetrical heads were the brightest mentally. In view of his experience he thought it very uncertain how much bearing the measurements of

the skull had upon the brain inside. The brain was very tolerant and could adapt itself to almost any condition, if that condition was slow in developing. Dr. Chapin said they had measured about 100 skulls and about all they found was the cephalic index. However, he thought the study presented by Dr. Clark was of great value and said he would be glad to follow it up.

DR. JOHN A. COLLIVER, Los Angeles, asked Dr. Clark on what ground he based his statement that smoking had an effect on skull development. He had had an extensive experience in the Juvenile Court of Los Angeles with cigarette fiends and while he had not made as accurate observations such as would be possible by Dr. Clark's method, he had not seen any marked stigmata that were particularly characteristic of smokers and the size of the skull did not seem to be related in any way to the tobacco habit.

DR. G. HARDY CLARK, Waterloo, Iowa, in closing the discussion, said he had taken the cephalic index of fifty babies that were normal and of fifty children that were feeble-minded and the cephalic index of both groups was seventy-nine, so he believed that one could not come to definite conclusions as yet. The whole subject was very complicated but he believed that with a reliable system of taking measurements they were now in a position to make some progress. It might be that they could make an accurate score of correct development and in that way a head could be scored with considerable accuracy as a 95 per cent. head, a 50 per cent. head, etc. It might be possible to determine the effect of heredity and training in connection with skull development and mental condition.

With regard to the question of smoking there was no question as to its deleterious effect. He had begun some years ago to make inquiries among school superintendents as to the effects of tobacco on boys and was convinced that when a child ten or twelve years of age used tobacco this narcotic was responsible for changes in the development of the skull and in the mentality. It was difficult to make definite statements on the subject as just at this time, at the age of puberty, skull changes were going on with unusual rapidity. The point emphasized was that with the method presented one could chart any point on the skull and know just how far it was from the perpendicular and from the base line and by taking the measurements from time to time could follow accurately any changes that were taking place.

TUBERCULIN TESTS IN CHILDREN OF COLORADO.

DR. GEORGE H. CATTERMOLLE, Boulder, Col., stated that most of the available statistics on the prevalence of tuberculosis among children were chiefly derived from studies made in hospitals and in the dispensaries of large cities, while there were very few reports of observations made in private practice, or on large numbers of school children living in small communities. A study of the statistics of the large cities of Europe and America gave the author the impression that the percentage of children reacting positively to the tuberculin test in these cities was much larger than would be found

to be the case in Colorado. He presented the statistics referred to which showed that as many as 80 per cent. reacted positively to the tuberculin tests. Dr. Manning had tested 288 children in Seattle and found that only 22.8 per cent. reacted positively. The author had tested sixty-nine children under fourteen years of age in private practice and found that over 60 per cent. gave negative results. This was the more remarkable in that in over 50 per cent. of these cases one or both parents were tuberculous. As the result of his observations the author concluded that where children had never been infected or in cases in which the number of bacilli received was small, and the child's resistance good, as in Colorado, they did not react and were either not infected or were immune. In this series of cases there seemed abundant opportunity for infection and he believed that many of the children were immunized, though this point required further study. Possibly all tuberculosis was acquired in childhood and from three-sevenths to six-sevenths of the population acquired immunity at this time while the others succumbed to the more acute conditions of childhood or later developed pulmonary tuberculosis. In the prevention of tuberculosis one should aim to protect infants from all sources of exposure and older children from massive infection. Moderate and gradual infection in older children probably insured immunity.

DISCUSSION.

DR. JOHN A. COLLIVER, Los Angeles, said he had just returned from von Pirquet's clinic and that there they had been making tests on different parts of the body as well as in the ordinary location. They found that there were some slight differences in the degree of the reaction in different locations but not enough to make it worth while to change the place of making the test from the forearm. They also found that a large number of children who did not react to the von Pirquet test would react to the Moro test. In the routine work of von Pirquet's clinic they made the tests on the forearm with the von Pirquet drill. He himself, was now using a watch screw driver and thought it was better than the drill. They also charted the area about the point of injection into different zones, and thus designated amount of induration and the degree of redness was indicated as moderately red, markedly red and very red.

There was also a pseudoreaction which might occur during the first two hours but the true reaction started in later. The intensity of the reaction might be delayed forty-eight hours and then necrosis might follow.

In diabetics there was a peculiar reaction; there seemed to be something which interfered with the reaction and would not let it come out so that in diabetic patients one had to take this into consideration.

DR. C. G. GRULEE, Chicago, said there was one point which was very important and that should be emphasized and that was that in the large proportions of infections the infection was from one individual to another. There was no question that the number of

infections from individual to individual far exceeded those from milk.

DR. LANGLEY PORTER, San Francisco, said that the point just mentioned was the most important in the whole discussion, that was that infection from individual to individual was the most common means of transmitting tuberculosis. In 100 cases of tuberculous meningitis the source of infection was definitely traced to human infection. Many infections in children might be traced to grandparents. Most old people said to be suffering from chronic asthma and "winter cold" were in reality suffering from tuberculosis and frequently were responsible for infections in those about them.

DR. HENRY DWIGHT CHAPIN, New York, said that if they attributed infection to the bovine bacillus many people were frightened out of using milk, and if milk was going to be ruled out they would be depriving the tuberculous patient of the most valuable food.

DR. E. LACKNER, Chicago, said that they had been making tuberculin tests on all the children entering their hospital. In view of the reports from European clinics and from several in this country they had expected to find a high percentage reacting positively, but they had been agreeably disappointed to find so few suffering from tuberculosis. They had tested about 400 children from the Ghetto and found not more than 20 per cent. tuberculous. The tests were made carefully and watched carefully afterward.

DR. JAY I. DURAND, Seattle, said that Dr. Manning's statistics for Seattle might be explained by the fact that they had been carrying on a very vigorous campaign against tuberculosis in that city and every child showing even the slightest clinical evidence of the disease was tested. Whenever tuberculosis was diagnosed in a parent the children were examined and tested, and he felt that some of these children that did not react at the first test might react later.

DR. J. P. SEDGWICK, Minneapolis, said that Dr. Durand had just spoken of examining the children when the parents were found to be tuberculous; this suggestion was equally important to the internist and would work the other way around. When a child was found to be tuberculous the parents should be examined for the disease. This was a rule which would work well both ways.

DR. SWEET, Fresno, Cal., said the question came up whether they might not find cases showing signs of human tuberculosis which would react negatively to the test for human tuberculosis but positively to the test for bovine tuberculosis. In spite of all that had been said he thought that possibly there might be instances in which the reaction would be negative to the human test and positive to the bovine test and yet the child have tuberculosis of the human type.

DR. T. C. McCLEAVE, Berkeley, Cal., said he had talked before about tuberculosis infection and did not intend to say anything to-day, but that with reference to the proportion of bovine and human tuberculosis it was usually regarded as proven that tuberculosis of the human type was very much in the preponderance. The only thing that remained was the stubborn determination of the men who emphasized the importance of the human type to cling to their

habit of not liking to hear that any bovine tuberculosis existed and who did not like to hear any mention of it because they thought it tended to divert attention from the more important question of human infection. This attitude of mind was fast disappearing. The last speaker emphasized the fact that infection from one human being to another was the main source of infection in children, but it had also been shown that 12 to 25 per cent. of all tuberculosis was of the bovine type and contributed to the surgical conditions for which tuberculosis was responsible. There was no reason for feeling that calling attention to one form of tuberculosis would divert our minds from the other.

DR. E. LACKNER, Chicago, called attention to the recent observations of Ghon who reported on 1200 pathological examinations. In such a large number one would expect to find some bovine tuberculosis yet Ghon found very little. In these 1200 examinations he found that 96 per cent. of the infections occurred by inhalation and through the lungs. His examinations were made with the greatest care and one could not question his findings.

DR. JOHN RITTER, Chicago, said one must not be led by the belief that when one got a positive von Pirquet reaction that he was dealing with a case of tuberculosis and neither must he conclude from a single negative test that the subject has no tuberculosis. In Rush Hospital they had been finding that many who reacted negatively to the von Pirquet test reacted positively to the Morro test.

Dr. John Ritter referred to the work of the English Commission which investigated the relative prevalence of human and bovine tuberculosis and said that a distinction should be made between phthisis and tuberculosis. The human bacilli usually were responsible for infections of the pleura, larynx and lungs while the bovine bacilli were more frequently found in infection of the peritoneum, glands, and bones.

Dr. Ritter said it had been his rule for years when a grandparent said he or she had asthma to watch the grandchildren and he had found that such grandparents infected all their grandchildren with tuberculosis. One could not emphasize too strongly the necessity of examining the children in families where there were such grandparents. The time in which the reaction showed itself varied; it might be twenty-four, forty-eight, or seventy-two hours. Where the reaction came on quickly it indicated an active focus and where it was delayed it indicated a latent focus. In instances in which one did not get a reaction with the first test a positive reaction might be obtained if one kept on testing.

DR. GEORGE H. CATTERMOLLE, Boulder, Col., said that the results of Ghon's work in Germany might be accounted for by the fact that the milk is all boiled and that might account for the absence of bovine tuberculosis.

Dr. Cattermole said he had brought this subject up to stimulate a general discussion and because he wished to arouse an interest in the skin tests about which some seemed to be at sea. To make it more interesting he had made the test on his own arm and on that of

his son. In his own case the reaction was positive while his son reacted negatively to the von Pirquet test. He also had made control tests on himself. In making the tests he used the lineal incision and a drop of old tuberculin.

QUANTITATIVE DETERMINATIONS OF NITROGENOUS ELEMENTS IN NEW-BORN.

DR. F. W. SCHULTZ and DR. C. J. PETTIBONE, Minneapolis, stated that Van Slyke and Meyer held that ingested proteins were absorbed into the body without undergoing any marked chemical change and that food proteins were first hydrolyzed in the alimentary canal and the products of digestion were absorbed in the blood and carried to the tissues. The products were deaminized in the walls of the intestine before entering the circulation and were synthesized into serum proteins before entering the circulation. They also reviewed the results of the work of Schondorf, Farr, Austin, Folin, Delaunay, Abderhalden and others in reference to protein metabolism and concluded that all the views were more or less incorrect. By the newer method of analysis it was possible to determine the nitrogenous elements of the blood with small quantities of blood, 15 to 20 c.c. The object of their work was to make a comparison of the nitrogenous elements of the blood in the new-born with those obtained in adults. They had made analysis in a series of twenty-six infants from one-half hour to ten days old. Determinations were made of the total nitrogen, the urea and ammonia nitrogen and the amino-acid fraction. Their tabulated results showed that the total non-protein nitrogen per 100 c.c. of infant's systemic blood was approximately the same as in adults. The age and weight of the infant and the length of time after feeding had no bearing on the results. The percentage of urea nitrogen was uniformly high and averaged about 50 per cent. of the total nitrogen. It was lowest in the new-born infant one-half hour old and in the cases that had not been fed. The amount of ammonia nitrogen was extremely small in every instance and was also not influenced by the age of the infant or the time after feeding. Probably the most interesting fact brought out was that amino acids were constantly present in appreciable amounts in the infant's blood and were found shortly after birth when no feeding had yet been given. It could hardly be said that the changes in the nonprotein nitrogen in the systemic blood reflected the stages of protein digestion.

DISCUSSION.

DR. LANGLEY PORTER, San Francisco, said this paper should not be allowed to pass without discussion if only to compliment the author. Such estimations were of importance and had been made possible by the brilliant work of Van Slyke and Meyer. Dr. Porter said he had been watching the work in Folin's laboratory and felt certain that anyone with a moderate amount of training could use the methods and that they would prove useful in solving certain questions that would come up on pediatrics.

DR. F. W. SCHULTZ, Minneapolis, wished to mention one thing in connection with this particular study and that was the very interesting work done by Osborne, Mendel and Lusk. They had been able to sustain life in animals for a considerable time by feeding elementary amino acids. These amino acids also sustained the weight and stimulated protein metabolism.

EPIDEMIC ABORTION REACTIONS IN CHILDREN.

DR. J. P. SEDGWICK and DR. W. P. LARSON, Minneapolis, reviewed the subject of epidemic abortion in cattle, showed that such epidemics were not infrequent and that they had been traced to the *Bacillus abortus*. Lesions had been produced in laboratory animals by the injection of the *B. abortus*. In their studies they had used the complement fixation test with the *B. abortus* as an antigen. In the course of their investigations they had examined the blood of puerperal mothers, new-born children, and children with bone lesions and various diseases. They had found the organism quite frequently in mothers who had aborted. It had been found oftener than a positive Wassermann reaction in aborting women. The *B. abortus* was found in children who were fed on dirty milk but not in children fed on clean milk. In two instances that had come under their observation women on farms where the cattle were suffering from epidemic abortion aborted. The symptoms of epidemic abortion reaction were very similar to those of tuberculosis. From their investigations it seemed safe to conclude that the *B. abortus* was much more common in man than had been supposed.

DISCUSSION.

DR. J. I. DURAND, Seattle, said that the paper brought up one point and that was the possibility of infection by absorption through an intact mucous membrane.

It seemed that one of the children at least in the cases reported had no intestinal lesions before being fed on cow's milk and that would suggest the possibility of infection by absorption through the intact intestinal wall.

DR. J. P. SEDGWICK, Minneapolis, closing the discussion, said in reply to the question as to how the antigen was prepared, that it had been made from *Bacillus abortus* cultures. Dr. Larson had been working with the organism in cattle and it had been very definitely identified.

CEREBROSPINAL MENINGITIS DURING THE TEXAS EPIDEMIC.

DR. J. S. BARDIN, Fort Worth, Tex., said that this paper was the result of his experience in treating eighty cases of cerebrospinal meningitis during the Texas epidemic of 1912. In Texas they regarded the disease as infectious and contagious and it was quarantined. The mortality in this series of cases was 18.75 per cent. They had observed a number of sporadic cases in which there was no evidence of exposure. It did not seem that weak and delicate children were more prone to the infection than strong, healthy, robust ones. It

had been noted that epidemics in Texas had occurred with the beginning of cold rains following a series of dry years with especially mild winters. The germ seemed to be everywhere, but only a small percentage of persons seemed to be susceptible of infection. In most of his cases the characteristic symptoms were present and the diagnosis was easy. There were some unusual cases that might have been taken for intestinal autointoxication or malaria. There were two symptoms which aided materially in the early diagnosis of the disease; these were the "meningitis moan" and the "meningitis expression." The moan was very characteristic and differed from the cry of hydrocephalic patients in that it had a certain degree of regularity. To one familiar with it this was a very characteristic symptom and one of the earliest. Likewise the facial expression of the early stage was very characteristic but also very difficult to describe; there was a loss of luster of the eyes and often absence of conjunctival reflexes, and usually a pinched expression with cyanosis. These two early symptoms were not mentioned in the literature but had been very valuable to the essayist.

The most important point in the prognosis was the character of the breathing. The duration of the disease was very variable. Most of the cases that recovered made a perfect recovery. The cases of spotted fever invariably died.

As to treatment, it was their custom to puncture every case, and if fluid came away under pressure to administer serum in every case. They had no absolute rule for giving the serum, but were guided by symptoms. They were likewise guided by symptoms as to the number of punctures and the length of time between punctures. The time between punctures had varied from six hours to two weeks. In posterior basic meningitis one might puncture the ventricles, but the essayist said he had had no experience with this method. He preferred the syringe method of injecting the fluid. During the operation of puncture he relied upon clinical symptoms rather than upon blood-pressure readings. The condition of the respiration during the puncture was the most important guide.

DISCUSSION.

DR. HENRY DWIGHT CHAPIN had seen cases of meningitis in the early epidemics with J. Lewis Smith, and that the description of the disease written by J. Lewis Smith was the best that had been written up to the present time. Formerly they did not isolate the cases of meningitis and he had seen no evidence that the disease was contagious.

Dr. Chapin said he had observed that if he could keep a patient with cerebrospinal meningitis alive for ten days or two weeks he would get well and he wondered whether the others had observed that to be the case. On this account nutrition was of great importance in cerebrospinal meningitis, for if it was possible to nourish the child well and keep him alive for say ten days he would probably get well.

Another point was that they saw very little effusion now compared with what they used to see in cases of spotted fever.

Dr. Chapin said that in his experience he had found the gravity method safer than the syringe method of administering the serum. One must insist on the injection being given slowly and the serum being warm. From fifteen to twenty minutes should be consumed in administering the serum.

DR. H. M. McCLANAHAN, Omaha, said that the reader had said that all the cases of spotted fever died, he supposed he meant all the cases with eruption. Years ago he had said the same thing himself.

An interesting point was that when he was a young man a large number of the cases had sequelæ, and now there seemed to be few cases in which sequelæ were observed. They now had deafness sometimes which they attributed to serum.

During the past year Dr. McClanahan said he had a case in which the lumbar puncture was dry and he punctured the ventricle. He did the operation with fear and trembling but there was no very great shock to the patient.

DR. LANGLEY PORTER, San Francisco, said that cerebrospinal meningitis was endemic in California and that they were constantly getting cases. They could divide the cases into two types, one in which there was increased pressure, and one in which there was no great increase in pressure but in which the fluid was thick, tenacious and gluey. In the cases of the pressure type the pressure could be kept down by lumbar puncture. The symptoms of the other type were not those of pressure but were rather toxic and indicated an irritative cord condition. The last two cases which he had had underwent closure of the aqueduct of Sylvius and became obstructive meningitis, and both were given repeated ventricular puncture and serum was administered but both went on to a fatal termination. Puncture of the corpus callosum, allowing the fluid to escape into the subdural space removed the hydrocephalus and might be employed with advantage when the aqueduct of Sylvius was closed.

Dr. J. S. BARDIN, Fort Worth, Tex., in closing the discussion, said that with reference to Dr. Chapin's remarks about keeping the child alive for a week or so, he thought that if the disease had a gradual onset the prognosis was better and it seemed that if one could keep the child alive for a few days there would be hope of recovery.

As to the method of introducing the serum, it might be that the gravity method was better than the syringe method. He had seen cases in which the child stopped breathing and he thought it was going to die during spinal puncture, but he introduced the stiletto and waited until the child got better and then proceeded with the operation.

DR. CHAPIN asked what the symptoms were that caused Dr. Bardin to stop during the puncture.

DR. J. S. BARDIN said that the symptoms that caused him to stop were bad breathing and slow pulse and cyanosis. The pulse was slow during puncture in nearly all cases. When the above-mentioned symptoms intervened, he gave stimulants, strychnine,

atropine, etc., and then went on with the puncture because it offered the only chance of recovery for the patient.

In case one got a dry lumbar puncture it was possible that the fluid was walled off and one should try higher up. In an early experience in one case Dr. Bardin said he thought he had a dry puncture and finally called in another physician who drew off 45 c.c. of fluid and since that time he had been rather suspicious regarding so-called dry taps early in an attack. Later one might get a dry tap and a hydrocephalus. In his experience he soon learned to use a large needle, especially in cases in which he suspected a thick fluid. Many of the houses that were manufacturing the serum were putting out inferior needles; it was possible to make great improvement in the needles.

INVOLVEMENT OF THE URINARY TRACT AS THE RESULT OF FOCAL INFECTION IN CHILDREN.

DR. CLIFFORD C. GRULEE and DR. F. W. GAARDE, Chicago, reported a number of cases, giving the urinary findings in the early and late stages, in which the urinary condition seemed to be the result of a focal infection in some distant part of the body. In one case the primary focus of infection was an abscess in the neck and in another a mastoiditis, while in six or seven instances the findings indicated that the tonsil was the primary seat of infection. The most constant urinary findings in these cases were leucocytes, hyaline and granular casts and red cells. In a number of the cases there seemed to be no question as to the etiological relationship of the urinary condition and the focal infection since the same organism was isolated from the urine or blood that was found in the focus of infection. The treatment was urotropin and sodium bicarbonate. In these cases the amount of prostration was slight and the condition tended to rapid remission. The striking feature was the rapidity with which the urinary condition cleared up after the focus of infection was removed. The lesson taught was the importance of looking for a focus of infection in cases showing an abnormal condition of the urine not readily accounted for.

DISCUSSION.

DR. WALTER D. LUDLUM, Brooklyn, was surprised at the small doses of hexamethylamine that were given; it was not sufficient to be of any use. From 35 to 75 grains were necessary to be of any value as a urinary antiseptic.

DR. FRANK C. NEFF, Kansas City, said the gist of this paper as he saw it was that it was important to look for the focus of infection in cases that did not respond to therapy with hexamethylamine, etc. If one got a case in which a diagnosis of intestinal infection had been made one should not let it go with the conclusion that that was the only condition and allow the urine to escape attention, but one should attempt to locate the focus of infection and by treating that one would clear up the case.

DR. LAWRENCE T. ROYSTER, Norfolk, Va., asked if any had obtained good results in such cases with vaccine therapy, and whether they had used acid sodium phosphate for acidulating the urine.

Dr. Royster said that in the East they had a vast amount of discussion about the diarrheas of summer and a certain number of these cases presented exacerbations after the blood and mucus had disappeared from the stools. In these cases one should always examine the urine. In fact one should always examine the urine in the early stages of infectious diarrheas, not only once but one should examine two or three specimens. They would find that a number of these cases were due to pyelitis and the laboratory examination would frequently show the colon bacillus. This was indeed but one instance of the part played by the colon bacillus in infectious diarrheas.

DR. C. G. GRULEE, Chicago, said that perhaps theoretically Dr. Ludlum was correct in what he had said about the dosage of hexamethylamine, but practically such large doses were not necessary. He gave doses of only 2 or 3 grains. It was not broken up in more than certain amounts. He was confident that the urine cleared up equally well with small doses as with large ones. The very large doses might cause hematuria.

Dr. Royster's remarks were directed to a condition entirely different from the one to which his paper referred. He had not referred to colon bacillus pyelitis at all.

As to the acid sodium phosphate treatment, that had no relation to his cases, but was best adapted to colon bacillus pyelitis.

As to the vaccines, he had prepared them when possible but had never obtained any definite results in acute conditions, but he believed they protected after an acute condition had subsided. He cited one case in which vaccines had produced results after other methods of treatment had failed.

The colon bacillus infection occurred quite frequently after infectious diarrhea but one got very few of colon bacillus infections after operations for harelip and cleft palate. The route by which the colon bacilli got into the kidney was thought by many to be by an ascending infection through the urinary tract, but it seemed to him that it was much more probable that infection occurred through the lymphatics, for the lymphatics led from the cecum to the right kidney.

MENTAL AND PHYSICAL SURVEY OF SUPPOSEDLY NORMAL CHILDREN.

DR. LANGLEY PORTER, DR. A. HUFFAKER and DR. A. RITTER, San Francisco, presented this paper which was the result of a study of 195 children all over two and one-half years of age. These children were boarded out by the Children's Agency of the Associated Charities, and were cared for at the Agency Baby Clinic by Dr. Holsclaw and Dr. Rude. It had been the belief entertained by the essayists that many apparently normal children were not normal and these examinations were made to ascertain the correctness of this view. The Wassermann and von Pirquet tests were also made. It was

found that 55 per cent. of these children were in need of dental care and that 53 per cent. had diseased or hypertrophied tonsils. Only four of the children gave a positive Wassermann reaction.

The classification adopted for the mental condition of the children included the following groups: normal, retarded, border line, moron, and imbecile. The most interesting groups were the retarded and the border-line cases. In the retarded group were placed those who did not test up fully to age, but whose environment or health conditions might be considered as responsible for the temporary retardation. Such cases should be sharply differentiated from the feeble-minded group, since one might do an irreparable injury by placing a child but temporarily retarded in the feeble-minded group. Into the border line group were placed those cases which were not normal, though they might seem normal intellectually, but whose environment was bad and training often vicious, and whose mental equilibrium was limited during the development period. Most delinquents fell into this class and might be prevented from becoming criminals by careful supervision and guidance. They had examined 119 children and following this classification they found that the absolutely normal children comprised almost 66.5 per cent. of the entire number; in the retarded group were 23 per cent.; the border-line group 7 per cent., and there were four morons and one imbecile.

With reference to the physical examinations the most interesting fact was the high proportion of children who showed involvement of the tracheobronchial lymph glands, while only five cases showed the usual symptoms of involvement of the lung with tuberculosis. Eighteen children showed involvement of the mediastinal gland as was confirmed by radiograms. In this connection they had investigated Ewart's, von Koryani's and Oespine's signs, and their experience had led them to attach great value to the latter. This sign consisted in an echoed whisper following a spoken word heard in the stethoscope placed over the seventh cervical and first or second dorsal spine. They had also studied whispered pectoriloquy over the spine and had found that it ran parallel with the dulness. In well-developed cases of mediastinal involvement it was a much earlier and more delicate sign than any other yet brought to their notice. The x-ray had shown filtration in every case showing this sign.

In this series of children ear complications and eye defects were very rare. Nine per cent. of the series showed tracheobronchial adenopathy which would be interpreted as tuberculosis by many clinicians and which was tuberculosis in a large proportion of the cases.

DISCUSSION.

DR. C. G. GRULEE, expressed the opinion that percussion of the spine for tuberculous lymph nodes was very likely to fail in young babies since one could not get the finer pectoriloquy and hence percussion findings should be confirmed by the x-ray.

As to the enlarged tracheobronchial lymph nodes, in many cases

they cleared up much too rapidly to be regarded as tuberculous. As to the Wassermann tests, he was afraid they were inclined to put too much stress on the Wassermann reaction. He had seen a number of children in whom the Wassermann test was negative and yet the children had syphilis. A negative Wassermann should not be considered as excluding syphilis.

DR. EMMA MERRITT, San Francisco, was much interested in Dr. Porter's findings with reference to the tracheobronchial lymph glands. It was of interest to observe that many things which they were now finding out by means of the x-ray were formerly learned by other means. Some twenty-eight or thirty years ago in Paris Dr. Jules Seaman in *les Infantes Malades* stated that after whooping-cough there was an adenopathy, an enlargement of the tracheobronchial lymph glands, which would persist for a number of months. These older observers who did not have the clinical helps which we have to-day made very correct observations by means of autopsy, percussion and auscultation. They knew in those days that tracheobronchial gland enlargement could remain for some months after whooping-cough and that the condition was probably not tuberculous.

DR. A. HUFFAKER, San Francisco, recalled a point brought out some years ago by Dr. DaCosta in reference to getting the whispered pectoriloquy and that was the child in the sitting posture should lean forward and rest the elbows on the thighs and relax the muscles of the spine and then the physician should begin at about the eighth dorsal vertebra and continue the percussion on up the spine. At the eighth dorsal vertebra the resonance was normally full but over the upper three or four spines it was duller than over the others. As to the whispered pectoriloquy, one should coach the child to whisper ninety-nine lightly by having him pronounce the words as the examiner did. One should listen over the seventh cervical vertebra and over each succeeding spine; the sound came through over the seventh cervical vertebra and over the first or second dorsal vertebra. In their series of over 200 examinations they had found the whispered pectoriloquy as low as the fifth or sixth dorsal vertebra and in seventeen or eighteen cases in which this occurred there was some mediastinal abnormality, confirmed by the x-ray.

DR. JOHN A. COLLIVER, Los Angeles, had made a similar examination of some 2400 or 2500 children and while he had not gone as much into detail as Dr. Porter had his results corresponded closely with those reported in the paper. At about the age of puberty he had found accidental heart murmurs in 20 per cent. of the cases; he examined the same children two years later and found that seventy-five of these murmurs had disappeared.

DR. COLLIVER asked Dr. Porter if any effort had been made to correct the defects found and with what results. He said that in his experience he had found that a correction of the physical defects had diminished the delinquency.

The question of the effect of an abnormal condition of the teeth upon nutrition had come up before the California Dental Association

and the belief was expressed that the condition of the teeth had a direct relation to nutrition. From the standpoint of nutrition it was important to have dental defects corrected.

DR. H. M. McCLANAHAN, Omaha, asked Dr. Porter if he had found any relation between diseased tonsils and rheumatism, chorea, and retarded development.

DR. LANGLEY PORTER, San Francisco, in closing, said that Dr. Grulee had made the point with reference to the insufficiency of whispered pectoriloquy in young children. It was most difficult to get the whispered pectoriloquy in children of the "run-about" age. One could always get a baby to cry and the crying voice was as valuable as the whispered voice.

Dr. Porter said he agreed that a negative Wassermann did not mean the absence of syphilis. He had been working with Dr. Zinsser making Wassermann tests on different parts of the genital tract in mothers after the placenta had been removed, and they had found a positive reaction in the cord when the baby showed a negative reaction and other equally remarkable discrepancies. The Wassermann was only an empirical reaction to be used simply as so much evidence to be taken in connection with the other evidence upon which the physician was to exercise his judgment. As to the heart murmurs, they had taken account only of basic murmurs; the accidental murmurs were not considered as evidence of heart disease and were not reported.

Dr. Porter said they had not as yet undertaken any extensive correction of defects and hence he could not state what effects such correction would have in these children.

In answer to Dr. McClanahan's question he stated that they had found no rheumatism and no chorea in this series of children.

The subject of nutrition was of importance in connection with the removal of embedded tonsils. Frequently even throat specialists objected to removing buried tonsils, but their removal should be insisted on as it was frequently found that the nutrition and general condition of the child improved after such an operation.

STARCH DIGESTION IN CHILDREN: WITH SOME CLINICAL OBSERVATIONS.

DR. H. H. YERRINGTON and CLYDE T. WETMORE, San Francisco, after reviewing the physiology of starch digestion stated that their investigations had shown that many children were suffering from excessive amounts of starch. In the out-patient clinic of the Stanford Medical School they had been making a routine examination of urine and stools in the majority of cases for the past five years, especially those having intestinal disorders and in all cases examined for tonsil and adenoid operations.

There was a certain type of child whose diet was made up principally of carbohydrates and whose stools showed an excess of undigested starch. The report which they presented was based on the examination of 372 stools from 338 cases varying in age from one to fourteen years. In the series there were 267 cases of hypertrophied

tonsils, 41 of digestive disturbances, 10 of enuresis, six of rickets, and 14 of other conditions. The greatest percentage of starch excess was found in the cases having digestive disturbances and the next was rickets.

The essayists concluded that there was a type of indigestion in children presenting certain clinical manifestations brought on by the continued use of a diet principally of carbohydrates and that this condition could be cured by eliminating starches and giving a mixed diet at proper intervals. Frequent examination of the stools was absolutely necessary to aid in the diagnosis and to check up the progress of the case. Defects of the oral cavity should be corrected before attempting to correct errors of diet. Chronically inflamed tonsils and abnormal nasal secretions played a most important part in relation to the proper digestion of the child's food.

DISCUSSION.

DR. F. W. SCHLUTZ, Minneapolis, asked Dr. Yerrington if he had met any cases with skin manifestations in connection with starch indigestion, any facial eczema, urticaria or other skin lesions.

DR. E. C. FLEISCHNER, San Francisco, expressed the opinion that barley flour water in early infancy was responsible for more starch indigestion than any other food notwithstanding the fact that there might be a small amount of ferment to act upon starch at that time. One did not give meat and certain fats at that age notwithstanding the fact that there were certain ferments that would act upon them. Infants fed on condensed milk and barley water showed an excess of starch in the large proportion of the cases.

Another point to which Dr. Fleischner referred was cooking. This process was very important in preparing cellulose for digestion; proper cooking broke up the starch granules while poor cooking was responsible for a great deal of starch indigestion. Another phase of this question which suggested itself was that vegetable protein might be responsible for enuresis, asthma, and skin eruptions.

DR. HENRY D. CHAPIN, New York, took exception to what had been said with reference to the barley water. Some years ago Dr. Jacobi had brought out that cereal water broke up the casein of cow's milk and made it more easily digestible, and its use became quite popular. Then came the percentage method of feeding and the point was emphasized that it was important to get the different elements of the infant's food in exactly the same proportions as they were found in mother's milk and we were taught that cereal waters were anathema, that there was no scientific basis for their use. Experiments on dogs showed, however, that cereal water was a good attenuant to the casein of cow's milk. Certainly it was most humiliating to feed a baby carefully by the percentage method and to fail to get good results and then to have the parents tell you that they had bought a proprietary food at the corner drug store and that the baby was doing well. It was true that there was no barley water in mother's milk but the casein of cow's milk was not like the casein of mother's milk. In studying the science of infant

feeding the pediatrician should study in the same way as we study science at large.

Dr. Chapin said he was not in sympathy with much that had been taught in infant feeding. Each man had his own method which no one else could understand and all of this was very confusing and discouraging to the student. They had been going from one extreme to the other and it was time that this subject was threshed out.

As to the cereal water, it attenuated the casein of cow's milk so that it coagulated in smaller particles thus bringing the digestive enzymes into contact with a larger amount of protein and facilitating the process of digestion. The practical way to study the problem of infant feeding was to find out what agreed with the baby and then to find the scientific reason for its use.

DR. LANGLE PORTER, San Francisco, said it was his practice to make a routine examination of the stools in nearly every child that came in merely as a matter of interest and with the idea that he might possibly learn something. He had found that when starch appeared in the stools in large quantities it was always accompanied by symptoms of starch indigestion and when the excess of starch was withdrawn from the diet this indigestion cleared up.

On the subject of infant feeding Dr. Northrup had given them the touchstone in his expression "feedings to fit." If that motto could be put up over every doctor's desk it would do more good than we are doing by this discussion. Some babies digest starch and some do not and barley water does not agree with a large number of children during the first few months of life.

The point with reference to thorough cooking for starchy foods was well taken since by this means the starch was broken up giving a large surface upon which the digestive ferments could act. This suggested to him one practical point and that was that some babies in the second year could not digest potatoes. In their clinic they called these children "potato babies." Their symptoms were pain referred to the umbilicus and starch in capsules in the stools and as soon as the potato was taken from the diet these symptoms disappeared. This might not be scientific but it was the truth. Some of these babies might a little later digest potatoes without any trouble. Again there was a difference whether the potato was new or old and also a difference in old potatoes; some were heavy and soggy and unfit for a child to eat.

Another point in reference to starch digestion was the teeth. Defective teeth, and especially bad molar teeth, interfered with the proper mastication of food and food starch was not properly prepared for the digestive enzymes.

Still another point was with reference to bread. It might seem strange to object to bread, but in babies from two to three years of age bread got into large masses and the surface area was not large and the starches were not split up. It was better to give children zweibach or hard crackers. These were also more desirable because they taught the child to chew.

DR. J. I. DURAND, Seattle, said that in Finkelstein's clinic he had seen babies fed on every percentage of carbohydrate and sometimes by increasing the percentage of fats one could get a gain in weight, or by using a higher percentage of fats with sugar. In some babies they got bad results with dextrose and maltose, but by feeding the same percentage of cream with milk sugar they got better results. In some older children there was a definite type of carbohydrate diarrhea but if these children were fed a higher percentage of proteins they could take a greater quantity of starch because the higher proteins brought into play different intestinal flora, and that was why when fermentative bacteria were causing trouble one gave protein milk.

Dr. Durand said he had found banana pulp most satisfactory in cases of diarrhea due to starch indigestion.

DR. H. H. YERRINGTON, San Francisco, said the discussion seemed to be on starch digestion, while the paper was on starch digestion after the first year. So far as skin conditions were concerned it had played no important part in this series, but one saw many cases with an urticaria or eczema in which the condition was corrected by cutting out starches. Dr. Porter had brought out certain points with reference to the diet and he would add that "schmiercase," gelatine jelly, meat, eggs and a mixed protein diet would correct starch indigestion.

CASEIN MILK FEEDINGS IN INFANCY AND CHILDHOOD.

DR. WALTER GELLHORN, Seattle, after giving a brief historical review on the use of milk rich in casein in infant feeding, related his experience with Feer's and Stoeltzmer's modifications in hospital and private practice during the past eighteen months. He stated that his observations conformed very closely to the experience of the authors who favored the use of casein milk, but he had found that he could improve results by making not only the carbohydrates but also the fats a variable constituent. Miller and Hoobler had published similar views. They had used the powdered casein which Hoobler recommended in the county hospital and had found it just as valuable as any other preparation.

The modification which they used was made of 4 per cent. milk. It consisted of 17 ounces of skimmed milk, $1\frac{1}{2}$ ounces of top cream, 17 ounces of water and three level teaspoonfuls of plasmon. This mixture was boiled. The caloric value after adding 5 per cent. dextro-maltose amounted to 440 calories per 1000 c.c. This mixture contained only about one-half as much fat as albumin milk, two-thirds of its calcium, and 0.8 per cent. more lactose. In severe cases the sugar was not started until the third or fourth day. The fats and sugar could be increased as the patient became able to care for additional amounts.

The author reported the results of this method of feeding in 163 cases, not hospital cases, from which he concluded as follows:

1. Casein milk feedings have been found to be successful as temporary food in certain conditions and whenever it was necessary

to wean a very young child abruptly. Although they do not seem to produce any harm by prolonged use, the advantages they offer is not sufficiently clear to recommend their substitution for the ordinary milk modifications in normal children.

2. They cannot replace breast milk in some of the severest cases, but in the great majority of nutritional disturbances, as seen in private practice, they will be found to be of assistance. They are indicated in disorders of fermentative origin and can be fed here in rapidly increasing doses regardless of the stool picture, provided the child does not develop symptoms of alimentary intoxication. Through their use prolonged and repeated therapeutic hunger periods may be avoided which are so frequently the cause of turning an originally mild into a serious disorder.

The Section elected the following officers: *Chairman*, DR. T. C. McCLEAVE, Berkeley, Cal.; *Vice-Chairman*, DR. E. P. COPELAND, Washington; *Secretary*, DR. E. P. GEGENBACH, Denver; *Delegate*, DR. H. M. McCLANAHAN, Omaha.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Proteolytic Ferments in Patients Injected with Antidiphtheritic Serum.—Reisz and Barabàs (*Jahrbuch f. Kinderheil.*, April 5, 1915) describe the experiments made by them with reference to the relation of anaphylaxis to the presence of proteolytic ferments in the serum of patients who have been injected with antidiphtheritic serum. It is well known that in such cases reinjection may be followed by a serum rash with general anaphylactic reaction. The authors state that the precipitins which cause the rash are found present in man for the most part in the third week after injection of the antidiphtheritic serum. The duration of their presence varies from the fourth to the ninth week. If the patient be now reinjected the precipitins reappear very quickly and in large amount. There appear also with the precipitins bodies which decompose the foreign albumins. These are proteolytic ferments, and they have much to do with the production of anaphylaxis. After the first injection of the foreign serum certain cell groups react to produce ferments. The resulting products may be poisonous and they may be generated so quickly and in so large quantity that the organism cannot dispose of them. The authors have investigated the length of time that these ferments can be found in the blood of the injected patient. That this is not simply a chemical, but a biological reaction is shown by the fact that simple mixture of the serum and the blood will not cause their production *in vitro*. Neither are they immune bodies. They are to be distinguished from antibodies, since with them they form other compounds. They play the rôle that antidotes play toward

poisons. Their nature is as yet unknown. Only by their reaction do we know of their presence. The authors tested the presence of these ferments by the serodiagnostic reaction of Abderhalden. The tests are given in detail and the results tabulated. Out of twenty-five cases tested twenty were positive. The longest period during which ferments were present was 171 days. The shortest period in which they appeared was one day. One case, which has been previously injected three years before the test, was positive in three-quarters of an hour. The quantity of serum used was from 2.5 to 30 c.c. The negative cases were five, tested on the 24th to the 310th days. The quantity used was 2.5 to 16 c.c. Three had been previously injected. The authors believe that in all cases the ferments are present at some time, after a sufficient interval from the time of injection. The long or short duration of their presence is due to the quantity of serum injected. Serum sickness appears on the eighth to the tenth day, while the precipitins appear at the end of the third week. The ferments can be found shortly after the serum injection. Probably at the time of the reinjection the previously formed proteolytic ferments cause the sudden precipitation of the albumins, so that the organism is unable to overwhelm the poisonous products of the albumins and these cause the rash and the other anaphylactic symptoms to appear.

Scleroderma of the New-born.—Ernest Mayerhofer (*Jahrbuch f. Kinderheil.*, April 1, 1915) reports two cases of a rare disease of the skin which appears immediately after birth. In a search of the German pediatric literature of the subject the authors found reports of only six undoubted cases of this disease. It is a kind of hardening of the skin, especially on the back, buttocks, and thighs, of a bluish-red color. As far as the etiology of the disease is known it is due to pressure at the time of labor. To these six cases the author adds two more, one of which was unique in the large amount of tissue covered by the hardening. The skin is flat, hard and in places nodular. A careful description of the author's cases is given with schematic representations of the extent of the lesions. In the more severe case the lesion covered the entire back, buttocks and posterior portion of the thighs. No treatment need be applied since the lesion disappears spontaneously in the course of two or three months. The cause is a combination of pressure and heat at birth.

Dynamic Pulse Examination of Children and Adults.—A. Hotz (*Jahrbuch f. Kinderheil.*, Apr., 1915) has studied the dynamic pulse rate in children and compares it with that of the adult. There are two methods of pulse examination, by the sphygmobolometer of Sohli and by energometry after Christen. The last-named method was used in the Zurich Kinderklinik by the author. Examinations were made of persons when quiet: thirty army recruits between twenty and twenty-one years of age were examined and the results compared with children in the hospital. The conclusions given by the author are these: in the healthy child the dynamic quality of the pulse is higher the greater the body weight, and is proportional to it. The height in adults and in children shows a wide variation.

Muscular work increases the energy of the impulse. Long and severe work has an effect on the pulse which lasts for several days, causing a better circulation in the tissues without increase of heart work. If there is too great muscular fatigue signs of poor heart function supervene in the form of lessened energy of the pulse with lessened fullness of the artery.

Mode of Infection and Etiology of Epidemic Poliomyelitis.—Simon Flexner (*Amer. Jour. Dis. Child.*, 1915, ix, 353) discusses the etiology of epidemic poliomyelitis. He believes that the microbic agent is present in the nasal and buccal secretions and is carried by persons, not insects, and communicated by them in such manner as to gain access to the upper respiratory mucous membranes of other persons, among whom a portion, being susceptible to the injurious action of the virus, acquire the infection and develop the disease. The clinical variety or form of the disease which they develop may be the frankly paralytic, the meningitic, or the abortive and ambulatory in which no severe symptoms whatever appear. But however the persons may be affected, they become potential agents of dissemination of the virus of poliomyelitis, as do a number of healthy persons who have been in intimate contact with those who are ill, and another group of persons who have recovered from an acute attack of poliomyelitis. These several classes of infected or contaminated persons constitute the active means through which the virus is spread and to the control of which sanitary measures designed to prevent epidemics must be directed. The virus or microbic agent of epidemic poliomyelitis appears to have been cultivated and to consist of minute globular bodies, capable of being distinctly viewed under the high powers of the microscope.

Leukocyte Counts during Digestion in Bottle-fed Infants.—A. G. Mitchell (*Amer. Jour. Dis. Child.*, 1915, ix, 358) presents a study of fifty bottle-fed infants on whom over 700 leukocyte counts were made. He finds that bottle-fed babies do not constantly show digestive leukocytosis; in fact, the majority show a smaller number of leukocytes in the superficial blood after taking food than before. This decrease is greatest at from one to two and a half hours after food, and tends to rise before the next feeding. When a rise does occur, it is most frequently soon after feeding, and begins to decline in a half hour. Crying, struggling and chilling of the part from which the blood is extracted increase the count. As to why some children show leukocytosis and others leukopenia after food, and why the same child may show at times an increase and at times a decrease after food the writer can offer no adequate explanation. Careful study of the cases as regards age, gain or loss in weight, character of stools, nature of food, temperature, and time of day did not show any definite relation. A theory which may be offered is that ingestion of food, and beginning of the activities of the gastrointestinal tract, both glandular secretion and muscular movement thus causing increased blood supply to the splanchnic area, may attract leukocytes away from the superficial blood, and result in a diminished number of cells when counted by the ordinary methods. Comparative

counts should be made at the same time of day, and at the same time in relation to food.

Mongolian Idiocy and Syphilis.—The etiology of Mongolian idiocy is unknown. One of the suggested causes is parental syphilis. H. C. Stevens (*Jour. A. M. A.*, 1915, lxiv, 1636) has examined the spinal fluid of twenty Mongols. The Wassermann reaction on the blood serum of Mongolian idiots was positive in 10 per cent. of the cases. The Wassermann reaction on the spinal fluid was undoubtedly positive in 25 per cent. of the cases. The Wassermann reaction on two fluids was doubtful. The gold chlorid reactions of these two fluids did not show typical luetic changes. Pleocytosis was present in 20 per cent. of the cases. The globulin content was increased in 90 per cent. of the cases. The gold chlorid reaction showed color changes of two or more degrees in 90 per cent. of the cases. The color changes of the gold chlorid are in the luetic zone. The father of two of the cases is known to have syphilis at present. This infection was acquired before his marriage. One child born dead preceded the two Mongolian children. The only abnormality in the spinal fluid of the children is the pleocytosis and the questionable Lange reaction in one case. The globulin content and the gold chlorid reaction parallel each other.

Acidosis in Children.—A. A. Howard (*Bost. Med. and Surg. Jour.*, 1915, clxxii, 747) says that acidosis in children is of frequent occurrence. Recurrent or cyclic vomiting, as distinguished by absence of predisposing factors is extremely rare. Cases apparently of this type should be subjected to careful study for possible concealed pathological conditions. The common clinical type of acidosis is what might be termed a complicating acidosis with predisposing factors. Clinically there are numerous conditions which seem capable of acting as predisposing etiological factors in the production of an acidosis. Acidosis should be considered a serious condition. Its early recognition and treatment is of practical clinical importance. Prophylactic measures are indicated and practical. Good results are secured by having the mothers start acidosis treatment, including cathartic, soda bicarbonate and light carbohydrate diet, at the first indication of the onset of any illness.

Onset of Hunger in Infants after Feeding.—It is now established that the subjective sensation of hunger is caused by a certain type of contraction of the fundal end of the empty stomach stimulating sensory nerves in the wall of the stomach. Since the contractions peculiar to the cardiac and fundal ends of the empty stomach are, in normal individuals at least, an objective index of hunger, H. Ginsburg, I. Tumpowsky and A. J. Carlson (*Jour. A. M. A.*, 1915, lxiv, 1822) have studied thirty normal infants, from twenty-four hours to four weeks old, by introduction of the balloon into the stomach. They find that the infant's stomach shows feeble tonus contractions of the fundal end, one hour after nursing. As the stomach discharges its contents these tonus undulations gradually increase in frequency and intensity until by the end of from two and a half to three hours these become transformed into vigorous hunger contractions. The time

of onset of hunger contractions after the previous feeding varies for each infant. In the present series the minimum is two hours and the maximum three hours. The hunger contractions of the empty stomach are modified tonus waves of the fundus of the digesting stomach. In the normal individual the presence of vigorous hunger contractions is probably a biologic evidence that the stomach is in proper condition to receive food. If this is the case, the stomach of a normal infant is ready to receive food from two to three hours after the previous nursing.

Use of Bismuth Pills in the Fluoroscopic Examination of the Infant's Stomach.—A. F. Hess (*Amer. Jour. Dis. Child.*, 1915, ix, 461) presents a study carried out by means of fluoroscopy after ingestion of keratin-coated bismuth pills having definite circumferences corresponding to the size of the catheters, which he has shown can readily be introduced past the pylorus in infants. The purpose was to furnish a simple means of gauging the size of the pylorus and judging whether this sphincter was normally patent or not. It was found that under normal conditions objects do not leave the stomach in direct ratio to their size; that larger objects are apt to be propelled into the intestine more quickly than smaller ones. This raises the question whether, following this analogy, food which has been insufficiently masticated may not remain in the stomach for a shorter rather than for a longer period than food that has been more thoroughly comminuted. Probably this is frequently the case. Under these conditions less work would be imposed on the stomach and proportionately more on the intestine, with the danger of consequent intestinal indigestion. There was a marked difference in the emptying time of the stomach, according to the posture of the infant. The delay in the passage of the pills when the infant lay on its left side, and the hastening of their passage when the infant was placed on its right side, were almost constant phenomena. It may prove to be of advantage to place infants on the right side when there is an evident delay in gastric digestion. In cases of pylorospasm there was a retardation in the passage of the pills from the stomach into the intestine. The degree of this delay varied in accordance with the degree of obstruction. The test does not enable us, however, to make a differential diagnosis as to the functional or the organic nature of the obstruction. In cases characterized by pyloric obstruction it was found that the pills left the stomach according to their size. In mild cases of spasm papaverin was found to be effective in definitely shortening the time of exit of the pills; in severe cases it lessened vomiting but did not facilitate the passage from the stomach.

Frequency of Infection with the Tubercle Bacillus in Childhood.—A study by B. S. Veeder and M. R. Johnston (*Amer. Jour. Dis. Child.*, 1915, ix, 478) of tuberculin tests in 1321 hospital children in St. Louis shows that the percentage of positive reactions reaches a maximum of 44 per cent. at the age period of ten to fourteen years, including cases with clinical tuberculosis. If children with clinical tuberculosis are excluded the percentage giving positive reactions at the ten to fourteen age period is only 36. These figures are much lower than

the usual "90 per cent." figure for the incidence of infection with the tubercle bacillus in children by their fourteenth year, which has gained widespread publicity and which is based on the figures of Hamburger for Vienna. The extent of infection among children varies in different cities and countries and is dependent on such factors as living and social conditions, the amount of tuberculosis in the community, the exposure of the child to open tuberculosis, and in all probability varies among different classes of society in the same community. No conclusions as to the extent of infection with the tubercle bacillus can be drawn from the statistics of any one city or class, and the statement that "90 per cent. or more" of individuals are infected by puberty is an extreme exaggeration of the actual conditions which exist. The intradermic tuberculin test has given but a slight increase in the percentage of positive reactions over the percentage of positive cutaneous reactions. Positive tuberculin reactions are of much service in the diagnosis of tuberculosis in infancy and early childhood, and both positive and negative reactions in conjunction with the physical signs and symptoms are of diagnostic value in individual cases among older children, although as a whole they do not indicate whether the infection is active or latent.

Bilateral Glioma of the Retina.—Glioma may be briefly described as a malignant tumor arising from the granular layers of the retina, almost pure white, traversed by a few blood-vessels, steadily advancing, without pain or symptom of constitutional irritation, until it has reached its second or glaucomatous stage. Unless the eyeball is enucleated, the tumor will perforate the coats of the eye and invade the orbit, or it will travel backward in the optic nerve and invade the brain. The only conservative treatment is the enucleation of the eye at the earliest moment. By this means the second eye may not be involved and the life saved. Fatalities occur as a rule within the first year, and should the patient survive without recurrence until the termination of the third year, the prognosis is favorable. Marshall states that the statistics of the Moorfields Hospital show that about 60 per cent. of the cases of glioma occur in the first two years of life and that about 80 per cent. occur during the first three years. Many instances are recorded in which the disease has manifested itself in the parents and children, or in several children of the same parents. In the case recorded by H. F. Hansell (*Amer. Jour. Dis. Child.*, 1915, ix, 485), a boy of two years, the disease was advanced in one eye and incipient in the other, but advancing so that enucleation of the second eye will be necessary.

Forms of Nitrogen in the Stools of Infants.—D. D. Van Slyke, A. M. Courtney and H. L. Fales (*Amer. Jour. Dis. Child.*, 1915, ix, 533) report that of the total nitrogen of infants' feces, from 50 to 70 per cent. was found as proteins and amino acids, 2.4 to 24 per cent. as free amino acids, and from 3 to 37 per cent. as ammonia. Usually, though not invariably, the higher percentages of amino acid nitrogen were found in the looser stools, quicker passage through the intestine resulting in somewhat less complete absorption of these protein digestion products. The results show no evidence of antago-

nism between the processes of acid and ammonia formation respectively in the intestine. Urea was certainly absent in three-fourths of the stools examined, and in the other fourth formed only from 1 to 5.6 per cent. of the total nitrogen. Despite the care taken to keep the feces free from urine, one cannot feel certain that at least a part of the few positive results may not have been due to the admixture of traces of urine. As some even of the watery stools contained no urea, it appears improbable that the intestine is capable of rendering significant assistance to the kidney, at least in the excretion of urea.

Ammonia and Urea Content of Infants' Stools.—J. L. Gamble's (*Amer. Jour. Dis. Child.*, 1915, ix, 519) experiments show that there is practically no danger of loss of ammonia nitrogen from stools during collection and storage, unless the specimen is allowed to lose moisture; but that during drying a very serious loss may occur, often as much as from 15 to 20 per cent. of total nitrogen from fresh stools, while from stools left standing for two days at room temperature one-half of the total nitrogen may escape measurement. Urea nitrogen was determined in fifteen twenty-four hour specimens from practically normal babies. The average for the fifteen stools was 13 mg. or 2.0 mg. per gram dried stool. The average in per cent. of total nitrogen was 3.5. The proportionate relationship between urea nitrogen and ammonia nitrogen is widely variable. Whether or not some of the urea found in stools was excreted by the intestinal wall, the writer is unprepared to say. That the intestinal flora are capable of producing urea is evident from an increase in the amount of it found in stools standing several days at room temperature.

Empyema of the Thorax.—In a critical study of 299 cases of acute empyema of the thorax treated at Mt. Sinai Hospital in the last ten years. A. O. Wilensky (*Surg., Gyn. and Obst.*, 1915, xx, 501) finds that empyema is a very common disease and occurs much more frequently in children than in adults. Two-thirds of the cases are children under three years of age. In the vast majority of the cases it is secondary to some other inflammatory lesion in the body. The average mortality for the series was 28 per cent., varying from 50 per cent. in infants to 18 per cent. in adults. The least unfavorable period is between three and ten years of age. Twenty per cent. of the patients die as a result of the primary illness, or of a recurrence of it, or of some other complication or intercurrent disease. Only 8 per cent. die because of the empyema, and half of these die in the first forty-eight hours. Twenty-three per cent. of the patients that recovered had more or less trouble with the healing of their wounds—one out of every four. Advances that will be made in the treatment of empyema will come from improvements in operative technic or in the after-treatment, which will tend to decrease the frequency of chronic empyema sinus to a minimum, or perhaps to eliminate it altogether.

Analyzing the same series of cases with reference to the formation of chronic empyema sinus, A. O. Wilensky (*Surg., Gyn. and Obst.*, 1915, xx, 647) finds that in 75 per cent. of the patients the cause for the formation of the chronic sinus was present from the very inception of

the disease. These can be grouped as follows: *a.* 52 per cent. had uncollapsible cavities. *b.* 7 per cent. had lung abscesses or bronchopulmonary fistulæ, or both of these together. *c.* 15 per cent. were tuberculous in origin. Excluding the tuberculous cases, which present a special problem—that of the cure of tuberculous infection—60 per cent. of the patients owed their chronic sinuses to conditions which were present and were not remedied at the primary operation. The method of operating for acute empyema must permit of a thorough examination of conditions in the chest and the removal or correction of any lesion which tends to the formation of chronic sinuses. The remaining 25 per cent. of the patients owed their chronic sinuses to faults in the after-treatment, which with good care can and should be eliminated.

Pellagra in Childhood.—F. C. Knowles (*Amer. Jour. Med. Sci.*, 1915, cxlix, 859) shows from the literature that pellagra is of rather frequent occurrence in childhood. In endemic neighborhoods approximately 10 per cent. of the cases occur in children. The disease is rare under two years of age. The affection is almost evenly divided between the two sexes in childhood. The negro is far less susceptible to the disease than is the white individual, particularly in early life. In endemic neighborhoods in about one-half of the cases two or more members of one family are attacked. In a considerable number of cases in children, pellagra follows shortly after the exanthemata, particularly measles. In the South, pellagra in children frequently develops in those with hookworm. The skin eruption in childhood is quite marked, while in a considerable proportion of cases the gastrointestinal and nervous symptoms, particularly the latter, are comparatively mild. Although formerly the death rate in children was rather high, at present, the disease occurs in a much milder form and the mortality is low. Heredity plays no part in pellagra, excepting by lowering the general resistance of the child, the disease is more readily contracted. The typical cutaneous outbreak or an accurate history of its former occurrence is essential in making the correct diagnosis of pellagra.

Congenital Defects of Anus and Rectum.—E. C. Brenner (*Surg., Gyn. and Obst.*, 1915, xx, 579) presents the results of a study of sixty-one cases of congenital defects of the anus and rectum that have been treated since the advent of aseptic surgery. Analysis of these cases shows that perineal dissection for fistulous openings gives excellent results and is a safe procedure. Perineoplasties for anal or anorectal obstruction in twenty-nine cases reveals a surgical mortality of 24 per cent., a percentage much lower than that in the period prior to aseptic surgery. Inguinal colostomy, though advised by some as the procedure *ab initio*, is attended with high mortality (66.6 per cent.) and is to be condemned except as a method of last resort. Celiotomy combined with proctoplasty is a novel and unique technic and promises good results in selected cases.

Lavage of the Spinal Canal in Cerebrospinal Meningitis.—Ch. Aubertin and H. Chabanier (*Presse méd.*, June 17, 1915) describes a new method of injections of the spinal canal for cerebrospinal

meningitis which he terms lavage of the spinal canal. It consists of removal from the spinal canal of a certain amount of cerebrospinal fluid in two of more portions, through the needle inserted for the serum injection, so removing from the canal the largest possible amount of germs before injecting the antimeningococcus serum. The pus is generally found to be quite thick, so much so that the needle is often obstructed by it. Thus removal of some of the fluid removes a large number of leukocytes and of germs. It has been found that this method of treatment is entirely innocuous and that it has an excellent effect on the disease. It is entirely painless. One-half of the authors' cases, who were soldiers, were treated by this method.

Method of Securing Bony Ankylosis of the Spine in Pott's Disease by Means of a Bone Transplant.—This is described by A. E. Halstead (*Surg., Gyn. and Obst.*, 1915, xx, 18) as follows: With the patient in the lateral prone position, an incision beginning on the median line above the kyphos is curved around this prominence and terminates below at the median line. A flap of skin and fascia is reflected back to the spinous processes. An incision is made along the lateral aspects of the tips of the spinous processes and extended for a distance of two vertebrae above and two below the diseased vertebrae. With a sharp chisel the soft tissues, including periosteum and the erector spinae muscles, are separated from the lateral surfaces of the spinous processes well down to the vertebral arch. After retracting outward, the tissue is separated from the spinous processes, the spines are sawed through at their bases, one above and one below the kyphosis. The severed spinous processes, with the connecting ligaments, are strongly retracted to one side and away from the bases. The prominent bases of the spinous processes at the apex of the kyphos are cut away with a chisel. A bone transplant is removed from the tibia in the usual way. The transplant is of sufficient length to reach from at least one vertebra above the diseased bones to one below. It is fashioned so that it will have periosteum on one lateral surface and on one border. From the lateral surface the periosteum is reflected back to the border to which the periosteum is attached. The patient is placed in the prone position and the transplant inserted between the cut surfaces of the divided spinous processes. The border of the transplant to which the periosteum is attached is toward the side from which the soft tissues have been retracted. The transplant is held in place by replacing the retracted, detached spinous process, and secured by passing heavy chromicized catgut sutures through the periosteum of the detached spinous process, the periosteum of the free margin of the transplant, and then through the periosteum at the base of the spinous process. The deeper portions of the wound are closed by buried catgut sutures, and the skin by silkworm-gut sutures. The spine is immobilized by means of a plaster-of-Paris molded splint for ten weeks.

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ORIGINAL COMMUNICATIONS.

SOME OBSERVATIONS ON THE TREATMENT OF
DYSMENORRHEA.*

BY

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LOOKING back over the literature of the medical world, one is impressed by the extraordinary number of articles which have appeared on the subject of dysmenorrhea. In fact, it is quite difficult to pick up a journal of general medical topics without finding somewhere between its covers a reference at least, if not an original article on the subject. When we come to reason why there is such an abundance of articles pertaining to painful menstruation, we are forced to admit the following:

1. Dysmenorrhea is extremely common, varying from the slight disturbances which many, indeed most, observers would classify as the normal menstrual molimina to those cases in which the symptoms are so marked as to totally incapacitate the patients from work for several days every month. Tobler and Engelmann (quoted by Doederlein, *Surg., Gyn. and Obst.*, 1914, xix, 165) state that from 50 to 80 per cent. of American girls suffer from dysmenorrhea.

2. While usually associated with several other symptoms such as headache, abdominal cramps and backache, dysmenorrhea itself is in reality only a symptom of some ulterior disturbance, and inasmuch as there are numerous such disturbances which give dysmenorrhea as a symptom, it is necessary in treating these cases to get at the underlying cause. The numerous articles which recommend a

* Read before the Obstetrical Society of Philadelphia, October 7, 1915.

particular treatment for painful menstruation, without specifying any type of dysmenorrhea, obviously fall far short of their mission.

3. The treatment of dysmenorrhea in many cases is unsatisfactory. This is shown by the numerous treatments that have been recommended and are being recommended, including drugs, massage, posture, electricity and operative measures.

Classification.—The various types of dysmenorrhea dependent upon pelvic inflammations and tumors and uterine displacements will not be discussed, but aside from the obstructive type, only those cases in which the pelvic organs are apparently normal will be considered. Many classifications of dysmenorrhea have been made, but for the purposes of this paper I shall divide the condition into the following types:

1. *Obstructive*, due to any obstruction of the lower uterine segment or vagina. These cases are usually operative ones.

2. *Secretory* or *ovarian*, due to alteration in the quantity of ovarian secretion.

3. *Vagotonic*, due to irritability or increased tonus of the autonomic nervous system.

Obstructive Type.—With regard to the obstructive type, the symptomatology is well known and consists chiefly of premenstrual pain for one or two days followed by a scanty flow during the first day of menstruation. Later the flow becomes more abundant and the cramps are apt to disappear as this occurs. This is the type so commonly associated with stenosis of the cervix and also frequently relieved by either instrumental dilatation of the cervix followed by the insertion of a stem pessary or perhaps more permanently relieved by the natural dilatation incident to labor. The results of instrumental dilatation in this type of case had been so encouraging that the profession became over enthusiastic and submitted all types of dysmenorrhea to this treatment with the inevitable result of having as many if not more failures than successes. This type is merely mentioned because of the likelihood of its being confused with the other types to be described. Naturally, the treatment of this type consists of removing the obstruction, whatever it may be.

Ovarian Type.—Let us now direct our attention to what may be designated as ovarian or secretory dysmenorrhea, which to me is the most interesting type and probably treated the worst by most practitioners. In this type of case the patient suffers from premenstrual headache, nausea and cramp-like pains in both ovarian regions at the beginning of the period and occasionally over the uterus after the flow has begun. These patients do not have premenstrual pain,

but frequently their attention is called to the fact that they are menstruating by the appearance of pain in the ovarian regions. As a rule, they are subjected to one or several cervical dilatations without relief and are then given one or more of the various so-called uterine sedatives and are compelled to endure this suffering month after month. Realizing these facts, let us for a moment look into the factors causing this type of dysmenorrhea and if we can ascertain the cause, the treatment and relief of the condition can be logically deduced. Klein (*Monatsch. f. Geb. u. Gyn.*, 1913, xxxvii, 169), in a study of the functional rôle played by the ovary, begins with the supposition that "health is equilibrium of the hormones." Every organ has its own specific hormone and these hormones are not, as at first thought, confined to the ovary, adrenal, pituitary and other glands of internal secretion. Confining our attention to the genital apparatus, however, we find that there is a chemical affinity between the ovary and the uterine mucosa and, further, that there is also an affinity between the ovary on the one hand and the tubal, nasal, vesical and rectal mucosa and mammary gland on the other. When the ovarian secretion is above normal, it causes hyperactivity of these various parts with which it has an affinity. Thus in ovarian dysmenorrhea the ovaries are markedly overactive and the congestion incident to this hyperactivity causes the clinical symptom of bilateral ovarian pain; but further, this increased secretion causes increased swelling of the uterine mucosa and secondary uterine colic occurs, giving the clinical symptom known as central pain and which, in this type of dysmenorrhea, follows the lateral pain in time of onset.

Treatment.—Obviously in treating this type of menstrual disturbance there is only one thing to be done, and that is to diminish the secretion of the ovary either at its source or by neutralizing the elaborated product after it has reached the blood stream. Either of these methods can be followed, with a confident hope for success on account of our recent advances in knowledge of the physiology and pharmacology of the ductless glands.

(a) Inhibiting ovarian hyperactivity.

Fliess in 1897 called attention to the relation between certain parts of the nasal mucosa, which he termed "genital spots," and the pelvic organs, especially the ovaries. These "genital spots" are located at the tubercle of the nasal septum and the anterior portion of the inferior turbinate in either side of the nose. The path through which this relationship occurs has never been demonstrated, but there is sufficient clinical evidence to warrant its existence. Since

this announcement of Fliess, there have been many workers who have taken advantage of this fact and thus the intranasal treatment of dysmenorrhea came into existence. In a word, the treatment consists of diminishing the vascularity and hypersensitiveness of these genital spots and following this, as a direct sequence, the vascularity and activity of the ovaries are diminished and the clinical symptoms disappear. Brettauer (*AMER. JOUR. OBST.*, 1911, lxiv, 214) in 1911 reported five cases treated intranasally and in 1913 (*Surg., Gyn. and Obst.*, 1913, xvii, 381) he reported sixty-six cases so treated, of whom thirty-three were immediately benefited, seventeen improved and fifteen unrelieved, these cases covering an experience of three years. His treatment consisted of cauterization of the genital spots with trichloracetic acid. In speaking of the type of case in which he used this treatment, he says that the patients are usually young women, married or single, for whom all recognized means for the relief of dysmenorrhea have been previously employed, whose pelvic organs present no organic lesion. The most marked symptoms in his series were premenstrual headache, nausea and menstrual colic after the flow had appeared. Mayer (*Jour. A. M. A.*, 1914, lxii, 6) claims 60 per cent. of cures and benefit in 75 per cent. of the cases from this type of treatment, having used cocain applications in part of his series and trichloracetic acid cauterizations in the remainder. Several other investigators have reported good results from this form of treatment, and by personal communication with several of my colleagues I have learned that they have had satisfactory though unreported results from the nasal treatment. There are two objections often raised against the application of cocain to the genital spots as outlined in this treatment, the first objection being that the relief afforded is only psychic, and the second being the danger of cocain absorption and habit formation. To the first objection let it be stated that, even if the relief be only psychic, it is *relief*, and that is what the patients desire, but as a matter of fact, the numerous favorable reports of cases under observation for many months must rule out the psychic element from the minds of most skeptics. Indeed it is a treat to see these patients walk into the office, hardly able to stand on account of the pelvic pain, and in many cases within a half hour after treatment they are absolutely free from pain. To meet the second objection, that of cocain absorption and habit formation, I have been using for many months a stock solution of adrenalin chlorid, 1-1000, applied locally in the same manner as cocain, and my results have been just as successful as with cocain and thus all dangers from the use of cocain are elimi-

nated. In applying the adrenalin, the solution must be kept in contact with the genital spots until they are thoroughly blanched, which will usually take about three minutes. Adrenalin is not only a good substitute for cocain, but it is even superior to it, because in addition to its local action it may be absorbed in small quantity and, when in the general circulation, it is a physiological antagonist to the ovarian secretion, the former causing a rise in blood pressure while the latter causes a fall.

(b) Neutralizing the elaborated ovarian secretion.

This fact constitutes the second means of combating ovarian hypersecretion—that is, to neutralize, as it were, the ovarian secretion which has been thrown into the blood stream, or after it has left its source. As stated above, adrenalin is the ideal drug for this purpose and, in addition to stopping the pain, it shortens the duration of the period. This treatment has not been used extensively in this country, but Klein (*loc. cit.*) cites many cases, in which other methods such as the Röntgen ray and operative measures failed, which were quickly relieved by adrenalin; in fact among the thirty-five patients who have taken the adrenalin, some hypodermically, some by mouth, he records only two failures. The dosage recommended is 0.0001 to 0.0005 gram in sterile normal saline solution, hypodermically. In the cases in which there is a relaxed uterus, however, in which blood clots form, adrenalin is not of as much use as pituitrin, which causes contraction of the uterus and expulsion of the clots. Although I have had no personal experience with the method, I merely cite it to show the possibilities of nonoperative treatment.

Vagotonic Type.—Under this heading I would place what has formerly been called essential or uterine dysmenorrhea, and in considering this type it is essential to have some understanding of the whole subject of vagotonia. In the first place, we must bear in mind that the vegetative nervous system which controls the involuntary musculature of the body is composed of two divisions, separate physiologically though not entirely so anatomically. These divisions are the sympathetic group of nerves or *sympathetic system* and the vagus group or *autonomic system*. These systems are antagonistic in their action and when the balance between them is finely adjusted, the organism is in perfect health. When, however, there is increased tonus of either system, there is produced a definite train of symptoms which are known respectively as sympathicotonia and vagotonia. Taking up the subject of vagotonia, which is the one in which we are most interested in discussing this type of dysmenorrhea, we can accept the definition of Kast (*Post. Grad.*, 1913, xxviii,

637), who states that "vagotonia is that condition of unbalance among the hormones of the body which manifests itself by increased tonus of all or most of the nerve fibers of the vagus group." The "vagus group," "extended vagal system" or autonomic nervous system, is composed of the oculomotor, chorda tympani, vagus and pelvic nerves; the latter, which is sometimes called the sacral division of the autonomic system, leaves the cord from the first to third sacral segments and supplies the uterine muscle in addition to other pelvic structures. In addition to this, the uterus is also supplied by fibers from the sympathetic system which are antagonistic to the autonomic fibers. According to Eppinger and Hess (*Jour. Nerv. and Ment. Dis.*, 1914, xli, 173), pharmacologically speaking, the autonomic system is stimulated by the pilocarpin group of drugs and paralyzed by the atropin group, while the sympathetic system is stimulated by adrenalin but no satisfactory paralyzant to this group has been determined. Therefore it may be seen that atropin and adrenalin may produce the same effects in the body, by causing opposite effects on antagonistic systems.

In vagotonic patients the uterus is in a spastic state, as it were, due to the increased tonus of its motor nerve supply, and as atropine is a definite paralyzant to these nerves, its use in this type of dysmenorrhea is most logical. The clinical picture of this type is that of well-marked colicky pains in the central part of the hypogastric region, sometimes radiating to the sacrum, sometimes beginning in the back and radiating forward. These cramps begin a day or two before the period and continue until the flow is well established, which is usually on the second or third day of the period. The pain is usually very severe and the patient is more or less of a mental and physical wreck during its continuance. Examination of these patients reveals the pelvic organs to be anatomically normal, therefore we must look for some other than an anatomical explanation, and we seem to have found in the nervous system a logical explanation for the symptoms.

Treatment.—As stated above, atropine diminishes the irritability of the autonomic nerves and after its administration there is a relaxation of the uterine musculature and a consequent disappearance of uterine colic. Stolper (*Wien. klin. Wochensch.*, 1914, xxvii, 46) divides his dysmenorrhea patients into two groups: (1) those with normal or nearly normal blood pressure, and (2) those with increased pressure. He states that the patients in the first group are usually benefited by atropine, while those in the second group are not at all helped by it. In this second group, after the pelvic circulation is

properly regulated, the blood pressure falls. The atropin treatment has been tried with favorable results by Novak (*Wien. klin. Wochens.*, 1913, xxvi, 2068) in Europe as well as by Novak (*Jour. A. M. A.*, 1915, lxiv, 120) in this country, who in a recent article says: "The results in thirty or more cases of spasmodic dysmenorrhea which I have treated with atropin have been very encouraging, so much so as to impel me to the further employment of the method." My own results in a limited number of cases have also been most satisfactory. The method of administration which I employ is to direct the patient to take $\frac{1}{100}$ grain of atropin sulphate two or three times a day for two days before the expected period and continue it after the flow appears until relieved of symptoms. In addition to this or any other form of treatment, the proper attention must be paid to the lower intestinal tract and general personal hygiene, and I am heartily in accord with Mosher (*Jour. A. M. A.*, 1914, lxii, 1297) regarding general hygiene and exercises, although I have not the high degree of enthusiasm that she has over the results obtained from exercises *per se*, possibly due to my lack of experience with her method of treatment.

TABULAR CLASSIFICATION

Type	Symptoms	Cause	Treatment
Obstructive . . .	Premenstrual uterine colic. Scant flow for one or two days. Pain disappears as flow becomes profuse.	Obstruction to lower uterine segment or vagina.	Removal of obstruction.
Ovarian	Bilateral ovarian pain synchronous in onset with the appearance of the flow; premenstrual headache and nausea. Uterine cramps after flow is established.	Increased ovarian secretion.	1. Intranasal treatment. 2. Hypodermic injections of adrenalin.
Vagotonic	Severe lower abdominal cramps and other symptoms suggestive of the obstructive type.	Increased irritability of the autonomic nervous system.	Large doses of atropine for a day or two before the expected period.

My object in presenting this paper is to make a plea for the careful differentiation of the various types of dysmenorrhea and, having accomplished this, to give the patient the benefit of that method of treatment which has been shown to be of avail in the particular type

from which she is suffering, and by so doing we may look for relief of symptoms in the large majority of cases. Let us hope that the promiscuous dilatation and curettage and the antidysmenorrhea proprietaries may soon be past history.

1503 GIRARD AVENUE.

THE OCCURRENCE OF CHORIOEPITHELIOMA FOLLOWING A LONG PERIOD OF LATENCY AFTER THE LAST PRECEDING PREGNANCY.*

BY

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(With two illustrations.)

CHORIOEPITHELIOMA is a tumor whose relation to a preceding pregnancy has been so conclusively demonstrated that (except in those rare instances of the occurrence of areas of chorioepitheliomatous tissue in complex teratomas) the presence of a definite chorioepithelioma is universally accepted as indubitable evidence of the occurrence of a gestation at some previous time. Since the tumor is made up essentially of the elements of fetal epithelial tissues—the syncytium and the cells of Langhans—it is inconceivable that such a neoplasm can arise unless this type of epithelium has previously been formed, a circumstance which we believe to be possible only as the result of impregnation. A point, however, about which there appears to be as yet but very indefinite knowledge, is how long such fetal elements may remain dormant and yet potentially active in the maternal organism after the termination of the gestation proper—in other words, how long after the last preceding pregnancy a tumor may conceivably arise from such cells. The large majority of chorioepitheliomas occur within a few months, or at most a year, after a normal or molar pregnancy, or miscarriage. When much longer intervals intervene, a suspicion of one of two conditions may be aroused—either that the tumor is in reality a carcinoma, or possibly sarcoma, with large cell-masses or other histologic appearances suggestive of chorioepithelioma, thus leading to a false interpretation, or else that a pregnancy—perhaps ending in early miscarriage—has intervened, and has been unnoticed or purposely concealed by the patient. A sufficient number of cases have been reported, however, in which the intervening or latent period between the last

* Presented before the Philadelphia Obstetrical Society, October 7, 1915.

demonstrable pregnancy and the development, either in the uterus or elsewhere, of an undoubted chorioepithelioma has been of very considerable length to raise the question as to whether it is not possible for the fetal epithelial elements to lie dormant in the maternal tissues for several years, only then to be aroused to active proliferation, thus giving rise to a malignant tumor of the type under discussion. The following case of this sort has recently come under my observation, and has brought up this point for consideration:

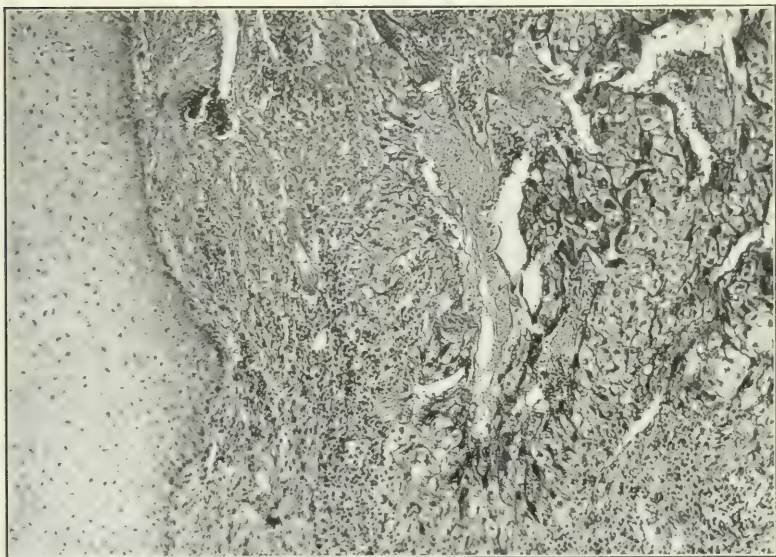


FIG. 1.—Low-power view through the edge of the growth, showing tumor cells surrounded by a zone of inflammatory infiltration in the vaginal wall burrowing under the squamous epithelium of the surface.

Mrs. B., aged forty-three years, was admitted to the Hospital of the University of Pennsylvania, service of Dr. John G. Clark, in May, 1915. She has had two children and two miscarriages, the latter of these occurring in September, 1906, at about the sixth week of the pregnancy. This is the last time she has been pregnant; her menstruation has been regular ever since, especially so during the last year. The patient, an exceedingly intelligent and straightforward woman, was insistent upon this point, and was not to be shaken by repeated questionings. She is absolutely certain that she has never conceived since the miscarriage in 1906. She was in good health up to the first week of April, 1915, when after some exertion she felt a heavy sensation in the vagina and a soft mass there, which she thought was a falling of the uterus. On examination by her family physician, a cystic ovary was diagnosed. The patient had no

pain at any time, and no undue bleeding, except at the time when she first noticed the pelvic symptoms; then there was a slight hemorrhage, which did not recur, nor interfere with her regular periods. Since then she has had a dark brown vaginal discharge, which is more or less continuous, but not copious.

On admission to the hospital, a soft mass was found on the posterior vaginal wall, in the median line, reaching to within 1 inch of the vulvar orifice, and extending to the rectal mucosa. Clinical diagnosis: carcinoma of the vagina. Operation (Dr. Clark): excision of the mass.

Specimen.—This is an oval mass of tissue measuring $6.5 \times 3.5 \times 2$ cm. One surface is in part covered by a smooth, whitish membrane,

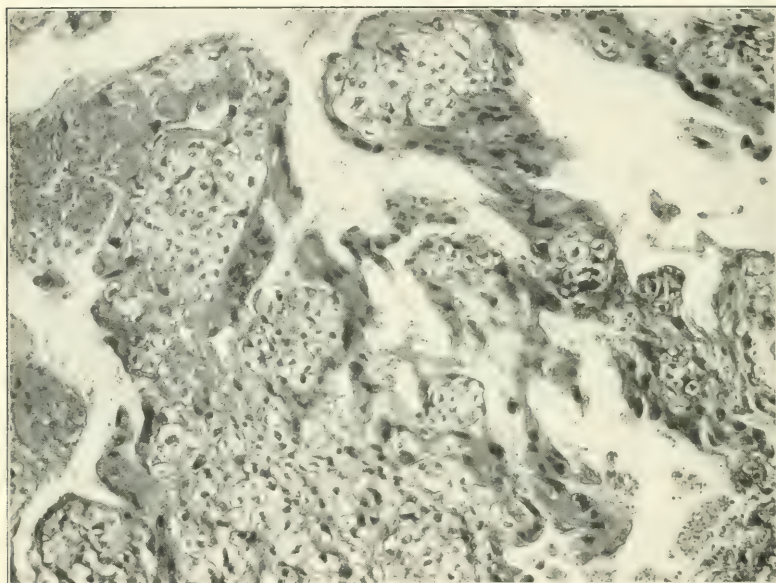


FIG. 2.—Somewhat higher-power view from the center of the tumor, showing masses of transparent, sharply defined Langhan's cells and more deeply staining syncytial clumps.

apparently representing the vaginal mucosa. The other side presents an irregular, necrotic surface, covered with a layer of soft, greenish-black, friable tissue. Microscopic sections (Figs. 1 and 2) show the characteristic appearance of a typical chorioepithelioma. The fibro-muscular stroma of the vaginal wall shows considerable congestion and inflammatory reaction. It is extensively invaded by large, irregular masses composed of clear, well-defined cells (Langhans' cells) and typical clumps of deeply staining syncytium, intermingled with areas of hemorrhage and necrosis. In places the surface layer of squamous epithelium covering the vagina is intact, with

tumor masses burrowing beneath it; in others it has been entirely destroyed.

To recapitulate, we have here a soft, obviously malignant tumor, appearing in the vagina of a woman of forty-three years, who had had, so far as it is humanly possible to determine, no pregnancy for eight and one-half years. Upon being removed soon after first causing symptoms, the tumor showed the characteristic histologic picture of a chorioepithelioma. It appears, therefore, that we are here dealing with an example of ectopic development of this type of tumor (the uterus being apparently uninvolved) after a very considerable period of latency.

The extrauterine occurrence of chorioepitheliomata, without involvement of the uterus itself, has been observed sufficiently often to be a well-recognized possibility. It is easily explained on the theory that villi, or masses of fetal (chorionic) epithelium, have been carried from the placental site, and have become lodged in a distant vein, there to remain dormant, though alive, long after all remnants of this tissue in the uterus have been destroyed by the normal processes of nature, subsequently to be fanned by some unknown agency into malignant proliferation at their site of lodgement. Of all the extrauterine sites at which such tumors have been observed, the vagina is by far the most common.

A much more interesting point is the occurrence of the tumor eight and one-half years after the last preceding pregnancy. As has been said, two possibilities may be thought of, either, (1) that in reality an unrecognized or unacknowledged pregnancy had intervened more recently, or (2) that the vaginal growth is not really a chorioepithelioma, but a tumor of some other nature. The first of these possibilities has been eliminated as far as we are able to do so, and certainly to the entire satisfaction of all of us who have talked with the patient. With regard to the second, the microscopic picture is so absolutely characteristic that—if there is anything at all in histologic morphology—not the shadow of a doubt could exist in the mind of anyone who examined the slides.

According to the at present universally accepted idea, there is at every normal pregnancy a very considerable invasion of both the endometrium and myometrium by fetal elements—syncytial wandering cells, trophoblast, and probably intact villi. It seems probable that in many instances certain of these elements may be carried in the blood stream to distant locations outside the uterus and become lodged there, as has been mentioned above. Under normal conditions, however, these fetal elements are destroyed by the natural

resistance of the maternal organism within a few days, or at most weeks, after the termination of the pregnancy. Were it not so, every normal gestation would be followed by the development of a chorioepithelioma. The question now arises, "How long may, in exceptional cases, these fetal elements remain intact in the maternal organism?" Marchand, the pathfinder in the histopathology of chorioepithelioma, makes the statement that we have no definite data for determining how long chorionic epithelia may remain alive in a closed vessel lumen, or a healed-over placental rest.

A remarkable case, recently reported by Ries, is of great interest in this connection. He found numerous persistent, fairly well-preserved chorionic villi in the veins of a myomatous uterus removed from a patient forty-five years of age *eighteen years after the last pregnancy*. Many of the uterine veins were filled with masses of the villi, which were in places attached to the walls of the vessel, in others lying free in the lumen. In this instance, all traces of the surface epithelium of the villi had been lost, their covering consisting apparently of endothelium which had grown out from the walls of the veins. "The size, shape, and general arrangement of the peculiar formations found in the veins," says Ries, however, "have caused me to call them villi. . . . The arrangement of the villi in bundles and grape-like masses in the veins, and the fact that they are multiple and distinct formations inside the lumen of the vessel are sufficient evidence that they cannot be thrombi. There is no other known condition that would simulate such a picture." The photomicrographs accompanying the article certainly leave little room for doubt that the structures are in fact chorionic villi. Ries believes that this case, presenting "the hitherto unparalleled picture of a benign survival of chorionic villi for as long as eighteen years after the last labor . . . tends to clear up the pathogenesis of those cases of chorioneplithelioma in which the tumor did not arise until many years after the last pregnancy." He was unable to determine at what period the surface epithelium of the villi may have disappeared, but suggests that the fact that it did disappear may account for the failure in this instance of any malignant tumor to arise, in spite of the long persistence of the fetal elements in the maternal tissues.

While comparatively few authors have concerned themselves with this question of latency in the occurrence of chorioepithelioma, several cases are on record in which the latent period was as long or longer than that in the one reported in this paper. In one of the most recent articles on this subject, Polano makes the statement that he has collected from the literature thirty-five cases of

chorioepithelioma "with a long latent period." He does not definitely state, however, just what he considers a long latent period, but it is evident that the lower limit must be comparatively short, since he gives a table of all cases in which it was two years or more, this comprising only twenty-five cases. Taking for further consideration only those cases having a latent period of five years or more, Polano tabulates:

1 case	with latent period of	5 years
2 cases	with latent period of	6 years
3 cases	with latent period of	7 years
1 case	with latent period of	8 years
2 cases	with latent period of	9 years
1 case	with latent period of	10 years
1 case	with latent period of	13 years

He himself reports a case with a latent period of ten years. He unfortunately gives no specific references to the literature from which he has collected his cases, and it has been impossible for me to verify them all. I have, however, been able to collect data of a sufficient number presenting a latent period of five years or more to furnish definite evidence that very considerable periods of time may elapse between the last demonstrable pregnancy and the development of a chorioepithelioma. The salient features of these cases are as follows:

Krösing.—(Latent period five and one-half years.) Patient fifty-two years of age, six children, two miscarriages. Last child twenty-three years, last miscarriage twenty-one years previous to admission. Molar pregnancy five and one-half years before admission; operation three years before (*i.e.*, two and one-half after the mole) for parovarian cyst. At this operation the uterus appeared entirely normal. Menstruation became scanty after this operation, and soon ceased; watery discharge for last year, becoming bloody for last month before admission. On admission uterus found somewhat enlarged; diagnosis, myomata. Hysterectomy performed, and tumor found to be a chorioepithelioma.

Sandberg.—(Latent period five and two-thirds years.) Patient fifty years of age, five children, last five years and eight months previous to admission. One miscarriage eleven years previously. Menstruation irregular since birth of last child, more profuse during last fifteen months; flowing every day for last two months. On admission, a nodular tumor found on posterior vaginal wall; uterus size of three months' pregnancy. At operation, uterus large, soft, nodular, of a dark, angiomatous color. Supravaginal hysterectomy, leaving the vaginal growth, which was removed a month later, this being accompanied by severe hemorrhage. Microscopic examination by *Findley* showed a hemorrhagic tumor in the substance of the uterine wall at the fundus, not involving the endometrium; both this

and the vaginal growth presented the histologic appearance of chorioepitheliomata.

McCann I.—(Latent period nine years.) Patient forty-six years of age, six children, no miscarriages. Last child born nine years before admission. Menstruation regular but scanty. For seven months before admission irregular bleeding at times. On admission uterus found enlarged and filled with necrotic masses; bluish nodule on anterior vaginal wall. The condition was considered inoperable, and the patient died two months later. At autopsy a large mass of chorioepithelioma was found in the uterus, with nodules in the lungs that were evidently metastases, but so degenerated that no satisfactory microscopic preparations could be obtained.

McCann II.—(Latent period nine years.) Patient fifty-three years of age, ten children, one miscarriage nine years before admission; this was the last pregnancy. Menstruation ceased one and one-half years before admission, no further bleeding being observed until the last five months, during which time free bleeding occurred every four or five days. A vaginal hysterectomy was performed, following which the patient died on the sixth day from anuria. The uterus was enlarged and filled with blood clot, masses of chorioepithelioma being found on histologic examination between the blood clot and uterine wall, invading the latter.

Polano.—(Latent period ten years.) Patient fifty-two years of age, eight children, the youngest born ten years previous to admission. This was the last pregnancy. Menopause six months before admission, but a slight discharge of blood had occurred three months before, following a fall. For some time, however, there had been a watery, malodorous discharge, with loss of weight and strength. On admission a tumor mass was found in the middle of the posterior vaginal wall and surrounding the external urinary meatus, the uterus being apparently normal. Both tumors were excised with the cautery, followed by rapid recurrence and death. Microscopic examination showed both tumors to be chorioepitheliomata; the uterus was normal.

The following cases may also be mentioned, but must be considered as distinctly less well authenticated with regard to the period of latency than the foregoing, because of the histologic findings in the second, and of the lack of satisfactory clinical data in the other two:

Nikiforoff.—(Latent period six years.) Patient thirty-four years of age, married for eighteen years, sterile. Six years before admission, however, a tumor-like mass had developed in the pelvis, accompanied by uterine bleeding which lasted for two months. A diagnosis of extrauterine pregnancy was made at this time, and operation advised, which the patient refused. Pain and tumor mass had persisted ever since, but menstruation was regular. About seven months before admission the mass began to increase in size, with constant uterine hemorrhage. On admission a hard, fixed tumor, the size of a child's head, was felt in right side of pelvis. At operation the tumor was found to involve the right tube and ovary, with

adhesion of the appendix and omentum. It had apparently sprung from the right tube, and proved microscopically to be a chorioepithelioma. Recurrence and death occurred in four months, extensive metastases being found at autopsy. The author believes it to have been a primary chorioepithelioma of the tube, following the supposed tubal pregnancy six years previously.

Giles.—(Latent period ten years.) Patient fifty years of age; nine children, four miscarriages. Last pregnancy ten years previous to admission; the patient stated that since that time she had never missed a period, nor had ever been even a day late. The periods had been regular and moderate up to three months before admission, since which time frequent slight losses had occurred. A hard lump had been noticed in the lower abdomen for a year. On admission the uterus was found to be the size of a four months' pregnancy; diagnosis: myoma. On opening the uterus after hysterectomy it was found to contain a tumor the size of a large orange, dark in color, and suggestive of a necrotic fibroid. Microscopically it was a chorioepithelioma invading the uterine wall. One pathologist who examined the slides found well-marked decidua, and concluded therefore that the uterus was either pregnant at the time of operation, or had been so extremely recently.

Barak.—(Latent period fourteen (?) years.) Patient fifty-eight years of age, epileptic and feeble minded. No history obtained. She died in a hospital, and at autopsy an extensive mass of chorioepithelioma and necrotic tissue was found involving the right wall of the uterus (the endometrium being free, however), the right broad ligament and ovary, and filling the entire pelvis, with metastases in the liver and lungs. Death had occurred some time after the menopause, but just how long could not be determined. After the patient's death, it was ascertained from friends that she had had four children, the last fourteen years before her death. Nothing was known of any subsequent miscarriage or molar pregnancy. The author considers the possibility of such, or of an ectopic gestation, having occurred subsequently, but thinks that in view of the age of the patient, even this must have been at least eight or ten years before the incidence of the tumor.

SUMMARY.

A case is reported of the occurrence in a woman, aged forty-three years, of a vaginal tumor presenting the histologic structure of a malignant chorioepithelioma eight and a half years after the last demonstrable pregnancy. It seems probable that we may account for such a condition on the theory that, whereas in the vast majority of cases all fatal elements are destroyed by the maternal tissues within a comparatively short time after the termination of pregnancy, in exceptional instances fetal epithelia may remain dormant in the maternal organism, either at the placental site or elsewhere, for months and years, then to be by some unknown agency stimulated

to malignant proliferation. Several apparently well-authenticated cases have been collected from the literature in which the period intervening between the last pregnancy and the development of a malignant chorioepithelioma amounted to more than five years, and one in which intact villi were found in a uterus eighteen years after the last pregnancy, without any malignant development. It is of considerable interest to note that in some of these cases of long latency, the chorioepithelioma developed *after the menopause*, a circumstance that would seem effectually to disprove the theory that in all such cases an undetected pregnancy has in reality intervened shortly before the development of the tumor. The fact that in six out of nine cases of long latency the age of the patient was fifty years or more is also of significance in this respect. We must bear in mind, therefore, that apparently malignant chorioepithelioma may develop after the lapse of much longer intervals in which no pregnancy has occurred than is commonly thought possible, so that in the presence of suggestive symptoms this condition should be thought of in considering the diagnosis, even in the case of an elderly patient near or beyond the menopause.

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A STUDY OF HYDROPS UNIVERSALIS FETUS, WITH THE REPORT OF A CASE.*

BY

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(With four illustrations.)

THE study of antenatal disease, from the purely clinical standpoint, is as old as medicine, Hippocrates himself having recorded a diverse series of cases. The study of such conditions from the scientific and experimental side is, however, recent, and indeed may be said, like the condition it investigates, to be at the threshold of birth.

By far the most notable contribution to the subject has been made by Ballantyne,⁽¹⁾ of Edinburgh, whose published works contain a wealth of information presented in most scholarly fashion.

The particular form of antenatal disease which has come under the notice of the writer, general edema of the fetus, or better hydrops universalis fetus, is one which, while fortunately of rare occurrence, has been a fairly frequent theme of medical essayists.

A survey of this literature reveals the fact that there is, as yet, but little attempt at uniformity in the classification of the cases and a most marked variance of opinion as to the causative factors.

This confusion is probably due to the fact (as held by many of the writers themselves) that most observers have seen but one or at most a very few cases, and the opportunity has not been given to one man to study a large series.

For a definition of hydrops universalis fetus, Ballantyne cannot be improved upon; he defines it as "a morbid condition of the fetus, characterized by general anasarca, by the presence of fluid effusions in the peritoneal, pleural and pericardial sacs, and usually by edema of the placenta, and it results in the death of the fetus or infant before, during or very soon after birth."

From the foregoing description it is apparent that the features of great interest in this condition are the pathogenesis and the mechanism of its causation, and it is here that opinions differ so widely.

The history of the case coming under the observation of the writer was as follows:

* Read before the American Gynecological Society, May, 1915.

Mrs. S., American; para-i, aged twenty-three years. She was of healthy parentage, had measles, chicken-pox, etc., in childhood, and there was a somewhat indefinite history of an attack of nephritis in infancy. When seventeen years old she had a severe and prolonged attack of jaundice, the cause of which was not determined. With these exceptions she had always been in excellent health.

Menses were established at thirteen, were regular, the flow excessive for the first year, then normal in amount and there was some dysmenorrhea during the first day.

Her first pregnancy was marked by a kidney insufficiency of moderate degree. There was hyperemesis during the first three



FIG. 1.—Placenta. The distended vessels and general edema seen under low power.

months, after which there developed albuminuria, together with the presence of hyaline and granular casts and erythrocytes.

Pregnancy was terminated by induction of labor at the thirty-sixth week, by reason of a moderate degree of pelvic contraction, and a healthy child was spontaneously delivered. The patient slowly recovered from her kidney lesion, the urine showing some albumin for months after delivery. She then remained in perfect health for a year when she again became pregnant (last menstruation, October 15, 1913). This pregnancy was marked by severe vomiting and nausea for the first four months, after which she was fairly comfortable until the seventh month. At this time, after some physical fatigue, she suffered an acute and lancinating pain in the right iliac fossa, whence it radiated to the umbilicus and

toward the back. The temperature was never above 99°; the pulse rose to 120; there was a leukocytosis of 12,500. The picture was that of an acute appendicitis, and the patient was treated upon that assumption by absolute rest, starvation, and cold to the abdomen.

The pain subsided after five days and she again felt well, until with some return of the abdominal pain there developed a rapid increase in the girth of the abdomen, with great distress from pressure. This condition continued, the hydramnios steadily increasing, until on June 10 she fell into labor. Upon rupture of the membranes an estimated amount of 1 gallon of liquor amnii escaped. The fetus lay in the L. O. A. position of the vertex; labor was long and tedious, but eventuated in the birth of a female

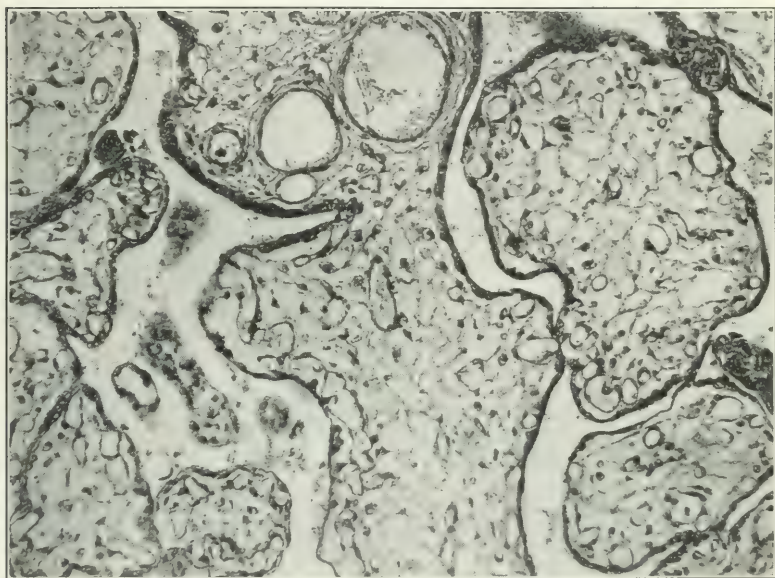


FIG. 2.—Placenta. The marked edema and vacuolization shows with wide spaces between the villi.

child, which did not breathe, although the heart action was feebly perceptible for a few moments. The pulmotor was used for one-half hour, without result.

The mother made an uneventful recovery. During this pregnancy she had shown a very faint trace of albumin in the urine on occasions, but had not been ill or shown any evidence of serious disturbance of the kidney, though she gave a clinical impression of suffering from some toxemia.

The child was a female, weighing 7.5 pounds. It was the seat of a marked general edema, involving the head, trunk, and extremities. The facial edema was so great as to almost obliterate the features; there was a large ascites, hydropericardium, and hydro-

thorax. Complete autopsy was not performed. The placenta weighed 4.5 pounds. It was soft, friable, pale, and enormously edematous. On section, serous fluid freely escaped from all parts.

Microscopically the villi showed a great edema and some degeneration of the syncytial cells (Figs. 1, 2, 3). The villi presented vacuolation, there was separation of the connective tissue by edema, and the syncytial cells were swollen, their nuclei pale, and in many instances shrunken.

The cord was thick and edematous, but showed no other change. In order to draw deductions from the histories of as many of

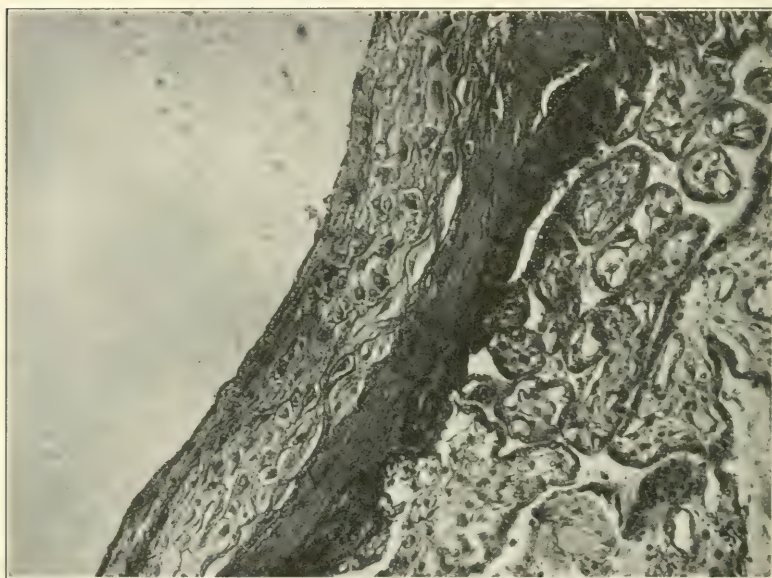


FIG. 3.—Edge of Placenta showing stratum spongiosum and degeneration of syncytial cells bordering upon it.

these cases as possible, all those recorded since Ballantyne's work (in 1902) have been tabulated and are appended to this paper.

An analysis of these cases finds them readily divisible into two great groups, each of which possesses certain common and integral features. These two divisions are: (1) those cases in which the edema is due to some mechanical or structural defect in the fetus or its membranes, and (2) those due to a toxemia of the mother and secondarily of the fetus, without any morphological defect necessarily present.

Two intricate and elaborate classifications have been suggested, that of Broekhuizen⁽²⁾ and that of Crozier.⁽³⁾ The Broekhuizen system is as follows:

FETAL CAUSES.

1. Heart and vessels.
 - (a) Fetal endocarditis.
 - (b) Congenital absence of a chamber of the heart (Pott).
 - (c) Small foramen ovale (Lawson Tait, Osler).
 - (d) Obliteration of the ductus Botalli (Nieberding, Ribemont, Desaignes).
 - (e) Displacement of the heart and vessels following diaphragmatic hernia (Damann, Behn, Fuhr).
2. Kidneys.
 - (a) Congenital cystic (Schürenk, Herinenier).
 - (b) Hypertrophy (Guéniat).
 - (c) Hyperplasia (Opitz).
 - (d) Fetal nephritis (Kuesch).
3. Liver.
 - (a) Hypertrophy (Seulen, Protheroe Smith, Nachtigäller).
 - (b) Atrophy and cirrhosis (Snow Beck, Russel Andrews, Berther).
 - (c) Hypertrophy of the liver and spleen (Potocki, Porak, Rainier).
4. Blood.
 - (a) Fetal leukemia (Sanger, Lahs, Siefert).
5. Fetal syphilis (Osiander, Cruvheiler, Spiegelberg, Strassmann).
6. Fetal peritonitis (Simpson, Opitz, Vecchi).
7. Absence of the thoracic duct (Smith, Birmingham, Ballantyne).

CONDITIONS OUTSIDE THE FETUS.

8. Thrombosis of the umbilical veins (Ballantyne, Betchler, Pollnow, Opitz).
9. Edema and hyperplasia of the placenta (Guise, Krieger, Basett, Ruge, Longaker).
10. Hydrops of the entire ovum.

REMOTE MATERNAL CAUSES FOR ANASARCA.

11. Malaria (Höuck).
12. Endometritis (Fuhr).
13. Hydremia (Betschler, Küller, Ritter).
14. Leukemia (Ahlfeld).
15. Chronic nephritis and kidney of pregnancy (Strauch, Kohn, Weber).

Crozier in his classification divides the causative agents of fetal edema into the following groups:

FETAL.

1. Lesions characterized by the presence of neoplasms, including cystic degeneration of the kidney.
2. Anomalies of development.

- (a) Cardiac lesions, hydropericardium, etc.
- (b) Absence of the thoracic duct.
- (c) Diaphragmatic or umbilical hernia.
- (d) Hypoplasia of the kidney.
- 3. Inflammatory Lesions.
 - (a) Fetal peritonitis.
 - (b) Fetal nephritis.
 - (c) Fetal syphilis.
- 4. Histological lesions of noninflammatory type.
 - (a) Suprarenal disease.
 - (b) Disease of the blood.

PLACENTAL LESIONS.

- 1. Edema of the placenta.
- 2. Inflammatory lesions of the placenta.

LESIONS OF THE CORD.

- 1. Velamentous insertion.

On considering these classifications it will be seen that, in both, the toxic group and the group of mechanical defects are very prominent, and the cases easily fall into one or the other division.

It is the opinion of the writer that those cases due to inflammatory disease or fetal peritonitis should not be included in this subject, but should be regarded as secondary to the specific form of inflammation causing the lesion.

In order not to duplicate work done, Ballantyne's analysis of cases reported prior to 1900 will be freely quoted in connection with those collected here, all of which have been published since that time. The clinical histories show some rather constant features. In Ballantyne's sixty-eight cases the mother was nearly always well advanced in her child-bearing life, and in only seven out of sixty-five cases was her age less than thirty.

This is not at all in accord with the statistics of cases reported since 1900, as in a total of thirty wherein the age was recorded, seventeen, or over one-half, were between the ages of twenty-five and thirty, of which number six were under twenty-five, nine were between thirty and thirty-five, and only four were over thirty-five years. Taking the recorded cases as a whole then, the majority have occurred in women over thirty, though if the more recent cases alone be considered these statistics must be reversed.

In only one of Ballantyne's cases was the mother a primipara, in all the others she was a multipara and had generally had a large number of pregnancies. As might be supposed from the greater youth of the patients, the mothers in the cases collected by the writer had had fewer pregnancies, five of them were primiparæ, eight had borne between one and three children, and seventeen were multiparæ of more than three pregnancies.

The previous health of the mother appears to play no great rôle in the development of a dropsical infant. In some instances it was described as "weakly, delicate," etc., but in general no stress is laid upon this portion of the history.

The previous obstetric history was bad in twelve of the writer's cases as against nine in which it was good. If this proportion, almost 66 per cent., be compared with an ordinary series of obstetric histories, it will, obviously, be found to be enormously increased, the usual ratio being certainly not over 10 per cent. at a very high estimation.

The maternal health during the pregnancy which resulted in the birth of the dropsical infant was, in general, much impaired, and herein lies an important factor in determining the cause and mechanism of production of these cases. The mothers were usually toxic, and in the thirty-four cases reviewed, twenty had marked edema during pregnancy, twenty-one had albuminuria of various grades, and eleven suffered from hydramnios. In any series of cases where 62.5 per cent. suffer with albuminuria, almost as many with edema, and a third with hydramnios, it is, to say the least, highly suggestive that some active agent in producing a pathological result is present.

Syphilis was conspicuous by its absence, six patients giving a positive reaction.

The pregnancies were frequently terminated prematurely, but when full maturity of the fetus was reached, the labors were usually tedious and difficult, owing to the swollen condition of the child, and in many instances were terminated by destructive procedures involving the fetus.

The child was usually stillborn or at most lived but a few minutes. None survived.

The morbid anatomy of the fetus and membranes is exceedingly varied and the lesions noted have been the basis of the greater part of the literature on this subject.

The general edema of the subcutaneous tissues and the serous cavities was the constant and invariable condition found. The

edema varied from small swellings to enormous distention, affected different specimens in different body regions, but was usually general and diffuse in character. The effusion was serous in type, occasionally thick and resembling pseudomucin. The edema was most marked in the subcutaneous tissues, there were usually hydropericardium, hydrothorax, ascites and commonly hydrocephalus.

The extremities were in general involved in the swelling, though occasionally there is special mention of the fact that they were not affected. There was commonly an anemia of greater or less degree. The visceral lesions varied almost with the individual case, there being nothing constant in the pathology, and in the thirty-seven cases analyzed, these lesions were distributed as follows: No lesions found, eleven; heart and vessels, two; urinary apparatus, six; liver, eight; spleen, four; suprarenal, two; blood, four; spine, one; tumors, one; no autopsy, two.

Such a wide range of morbid anatomy, so many different forms of disease, such vague conditions as "enlarged spleen," degeneration of the erythrocytes," and so on, point only to the conclusion that there is no specific pathology for general dropsy to be found in the fetus itself, and it is apparent that the cause may be sought elsewhere.

The one significant point in studying these infants is that in all of them the lesions may well be ascribed to defects in nutrition or errors in the circulation, a statement of great importance, as will be developed later. In Ballantyne's cases the morbid anatomy also had a wide range, anemia, diaphragmatic hernia, liver and kidney change, leukemia, and transposition of the organs being all noted.

The placenta, however, had almost constant characteristics. It was markedly edematous, very large, friable, soft, and pale, and where studied microscopically there was shown edema of the villi, or the vessels were obliterated and the lumina filled with cells and débris. In other words, there was a blocking of circulation and fluid interchange between the mother and the fetus, the block taking place at the point of most delicate balance, the placenta. In thirty-seven cases the placenta was described as edematous, and diseased in twenty-eight, negative in seven, and not studied in two.

The cord was in general thick and edematous, and in some instances showed a round-cell infiltration of its connective tissue. It has not been given especial attention by writers.

The pathogenesis and etiology of hydrops universalis fetus, as may be supposed from the different conclusions presented, is obscure. The older investigators considered the condition as due to maternal disease alone, nephritis and cirrhosis of the liver being accepted as

the underlying causes. Later the disease was thought to reside in the fetus itself. Osler described a cardiac anomaly and considered it responsible. Leukemia, congenital nephritis and many other conditions have been regarded as causative. The best explanation from the writer's standpoint was that of Fuhr, (4) who summarized the mechanism of the edema thus: (1) Chronic maternal endometritis, intensified by nephritis; (2) hyperplasia of the chorionic villi due to decidual increase following upon the endometritis; (3) excessive absorption of fluid blood into the fetal circulation (partly from maternal hydramnios), overfilling of the circulation in the fetus, with resulting obstruction and edema; (4) hydramnios due to increased secretion from the fetal kidneys, an increase not, however, sufficient to overcome the obstruction; (5) edema of the placenta due to secondary obstruction in that organ.

Schridde (5) believes that the entire complex is due to changes in the cellular elements of the blood and the blood-making organs.

The general status of the entire situation is very well summed up by Ballantyne who says, "Provisionally it may be supposed that general edema of the fetus may arise in the later months of fetal life, from maternal causes; possibly conditions, which increase the blood pressure in the placenta by causing structural changes in the maternal and (secondarily) in its fetal parts, may thus lead to backward pressure and transudation of serum in the fetal body. Again it may be supposed that in the early fetal or late embryonic period, structural anomalies may arise in the fetus (heart, kidney, liver, blood) which will directly produce the dropsy as it is produced in the adult; although with slight modifications and exaggerations on account of the peculiarities of the intrauterine environment. These fetal conditions it may yet be found possible to trace back again to morbid maternal states; and it may even be that maternal or paternal conditions existing in the sexual cells before impregnation may be potent to direct the life of the impregnated ovum into abnormal manifestations. Let us here leave this subject; it is clear that it is obscure; this alone is clear."

When a large series of these cases is analytically surveyed, there appear certain elements constant for all the cases, or nearly so, which seem to point toward certain lines of investigation.

The pathogenesis and the morbid anatomy of the specimens permit general edema of the fetus to fall naturally into two great groups, as has been stated. The first or mechanical group, including such fetal diseases as blood dyscrasias and so on, may be dismissed with the comment that such morphological defects may

or may not cause a general edema, as they interfere with normal circulation or not. The pathogenesis of the developmental errors, themselves, is not at all understood and in the present state of biological knowledge, it must remain as a problem unsolved.

The cases due to toxemia, however, offer opportunity for speculation, deduction, and experiment. It is the opinion of the writer that the development of this variety, comprising many more than half the cases, may be reasonably considered as due to the orderly sequence of a chain of factors, each one of which may be adduced by a careful study of the case histories, from the mechanism of the production of edema in general and from a study of the facts concerned in placentation.

Such a chain of factors would include the development in the mother of one or another of the forms in which toxemia is manifested; as a result of this, the production of a tendency toward edema in general, the edema being most marked at the point where blood and other body fluid interchange, is most specialized, *i.e.*, the stratum spongiosum of the placenta and the tufts of the villi. There would then ensue an edema of the placenta and a decrease in its functioning capacity with the secondary alterations in nutrition and circulatory disturbance in the fetus, culminating in a general edema of that organism.

Taking up the essential features of this pathological sequence in detail, maternal toxemia of pregnancy is so usual and ordinary an event that the fact of its occurrence requires no further discussion here. The influence of any toxemia in the production of edema in general is also obvious, though the exact manner of the escape of fluid into the tissues is not so clear. A concise and acceptable analysis is given by Stengel, (6) who states that the causes of an increased amount of fluid in the tissues are (1) an increase of blood pressure; (2) a decrease of tissue elasticity and pressure; (3) alterations in the blood, making it more diffusible; (4) alterations of the liquid in the tissues, increasing the osmotic quality of these; (5) increased permeability of the walls of the blood-vessels; (6) obstruction to the flow in the lymphatic vessels. Any one of or a combination of such conditions may be responsible for the appearance of edema in the presence of the toxemias of pregnancy.

If edema in general is present, it follows that the pathological increase in tissue fluids will be most marked in the region where the mechanism for fluid interchange between tissues is the most delicate and specialized. Such a region is the cortical zone of the placenta, where the fetal and maternal blood meet and exchange their products

of waste and repair. The placenta, to briefly review its anatomy, consists of two parts, separated by the intervillous space. The fetal side, or chorion frondosum, comes into close contact with the maternal side or the decidua serotina. This latter structure has as its base the uterine musculature and the deep layer of the mucosa; then follows the stratum compactum and lastly the stratum spongiosum just beyond which is the intervillous space, occupied by the villi of the chorion frondosum from the fetal side. From the surface of the compactum, processes arise, termed septa, which project into the intervillous space, grouping the villi into cotyledons and

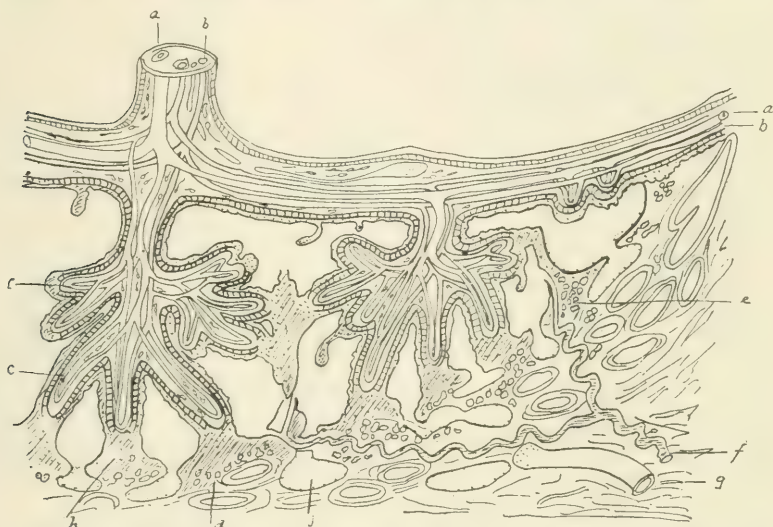


FIG. 4.—Schematic representation of the placental circulation (modified from Ettemod "L'oeuf humaine"). *a*, The chorio-placental artery; *b*, the chorio-placental vein; *c*, villi; *d*, *e*, syncytial cells; *f*, uterine artery; *g*, uterine vein; *h*, blood-space in the stratum spongiosum; *i*, blood-spaces in the stratum compactum.

giving fixation to some of the roots of the villi. These septa do not reach the surface of the chorion throughout the body of the placenta, but at the periphery, around a given zone, they do come into contact with the chorion and unite beneath it to form the closing plate (Fig. 4).

It appears true that the intervillous space is filled with maternal blood derived from the uterine vessels, without any restraining membrane being present, though Hertwig and others maintain that the space must be lined by a layer of endothelium.

However this may be, a free circulation of maternal blood occurs

through the intervillous space and the villi being completely immersed in this constantly renewed blood, an osmotic interchange takes place between the maternal blood in the space and the fetal blood contained in the vessels of the villi (McMurrich)(7).

This, then, is the point where toxins developed in the maternal blood, no matter what their origin, may exercise their activities upon the endothelium of the space and upon the syncytial cells of the chorion and cause a block of the normal osmotic interchange, and what is of equal importance may interfere with the metabolic, absorptive function of the chorionic epithelium.

It must be remembered that the nutrition of the embryo takes place in two ways, as well described by Keibel and Mall, (8) who state that, on the one hand, growth takes place by the transference of nutritive material from the blood of the mother to that of the child, and, on the other, by the direct absorption by the chorionic epithelium of products of the maternal mucous membrane, these products frequently being subjected to a kind of digestive process before they pass into the embryonic circulation.

These maternal substances are partly products of secretion, partly waste products, together with extravasated maternal blood and have been included by Bonnet under the name *embryotrophe* and by English writers have been designated *pabulum*. In the *hemochorial* type of *placentæ* there may be distinguished two stages of nutrition, an *embryotrophic* phase at the commencement of development and a later *hemotrophic* stage, not sharply differentiated from the former in time, but during which the nutritive material is received from the maternal blood exclusively.

It follows, then, that from the contact of fetus and mother at the placenta there is transmitted not only the blood, with its function of oxidation and removing the end products of oxidation, but also a distinct metabolic output takes place from the maternal tissues.

Both these phenomena are absolutely dependent upon the presence of cells fully capable of osmosis and of secreting and absorbing the nutritive elements. Any change in these cells brought about by toxins with edema and degeneration would at once disturb the metabolic balance and produce such resulting disorder of nutrition and of circulation in the fetus as readily to account for the changes found in *hydrops universalis*. The edema and cell degeneration of the placenta are well shown by Figs. 1, 2, 3, illustrating the case here reported.

The entire problem may be briefly summarized in the statement that *hydrops universalis* fetus is a condition characterized by a

general edema of the fetus, associated with a great variety of visceral changes and diseased states of the body fluids, or it may present no organic change whatever even to the most painstaking pathological examination, except, of course, the presence of abnormal amounts of serous fluid.

The condition is usually present in women who have shown the existence of some form of gestational toxemia, or in whom the presence of such toxic factor is suspected but cannot be confirmed.

It almost always is associated with edema and degenerative changes in the placenta, the microscopic picture of which is very comparable, in general, to that shown to exist in the present case.

In the opinion of the writer, hydrops universalis fetus is due to a maternal toxemia impairing the circulation and the nutritive function of the placental cells, and thereby causing secondary circulatory and nutritional defects to ensue in the fetus.

An abstract of the cases reported since 1901 is appended.

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1823 CHESTNUT STREET.

HYDROPS UNIVERSALIS FETUS.—Cases reported since 1901.

Writer	Age	Para	Obstetric history	Wa-R.	History of present pregnancy	Pathology; fetus, membranes, placenta, etc.
Ludwig(9)	32	ii	First pregnancy normal.	.....	Rapid enlargement of the abdomen, pain, dyspnea, hydramni- ^s , edema of legs, albuminuria; spontaneous birth, dead infant.	Weight 2030 gm. General edema, trunk head, extremities, endocarditis; mitral stenosis.
Opitz(10)	32	xii	.....	.....	Induced labor eighth month; marked edema of the trunk and legs; marked albuminuria. Hydramnios. Delivery by craniotomy and dismemberment.	Fetus enormous edema. The entire urinary apparatus was very hypoplastic. Placenta enormous, edematous, weighing 2280 gm.
Vecchi(11)	32	0	.....	.....	Edema of legs, genitals, and face; marked albuminuria. Premature delivery with forceps. Fetus stillborn. Mother developed puerperal eclampsia. Recovery.	Fetus showed polydactylia; plastic peritonitis; some degree cystic kidney. Placenta and cord large and edematous.
Sitzenfrey(12)	30	iv	Previous pregnancies normal, labor spontaneous.	—	At six months had influenza followed by edema, albuminuria and casts; marked nephritis; hydramnios. Fetus stillborn.	♀ 2410 gm. Extreme edema; acute nephritis. Placenta edematous, weight 2000 gm., diameter 38 cm. and showed edema of villi; cord showed edema.
Commandeur(13)	40	i	Spontaneous delivery of a healthy infant.	.....	Spontaneous delivery of a six months' dead fetus.	General edema, weight 1890 gm. Ascites (450 c.c.); acute nephritis. Placenta normal.
Kreisch(14)		iv	First three pregnancies normal.	—	Nephritis, marked albuminuria, edema hydramnios. Difficult, destructive delivery of a dead infant.	Fetus, general edema, weight 3050 gm. No autopsy. Placenta enormous, edematous, weight 2025 gm.
Fanchu and Rigaud.(15)	20	0	.....	—	Delivered at eighth month. Labor long and tedious. Fetus showed beginning maceration. Marked albuminuria.	General edema. Liver, spleen and kidneys normal. Placenta, 620 gm.; markedly edematous.

HYDROPS UNIVERSALIS FETUS.—Cases reported since 1901.—(Continued.)

Writer	Age	Para	Obstetric history	W a. R.	History of present pregnancy	Pathology; fetus, membranes, placenta, etc.
Charles(16).....	42	vi	Three normal pregnancies; one stillborn; one child died a few hours after birth; fifth child showed general edema.	.....	Edema of legs and abdomen. Hydramnios, marked albuminuria, spontaneous delivery at seven months. Child died ten minutes after birth.	Fetus, weight 2750 gm.; general edema. No autopsy. Placenta, weight 1850 gm., very edematous.
Andrews(17).....	28	vi	No abnormal children.	+	No edema, no hydramnios. Slow labor. Child breathed for a few moments.	General edema of the child; all organs normal except liver, which showed well-marked cirrhosis. Placenta and cord show no changes.
Case II.....	36	v	.....	—	Swelling of the legs, dyspnea and headache, albumin and casts in urine. Twin pregnancy—a healthy child followed by one, the seat of general edema; died immediately after birth.	Child, general edema, weight 3 lb. 10 oz.; no lesions in the organs. Placenta very large, pale, edematous. The chorionic villi have their lumen filled with cells and the vessels are obliterated.
Jatho(18).....	26	ii	First birth a dropsical infant, lived two days.	.....	Much edema of legs, labia and abdominal walls; excessive albuminuria. Spontaneous birth, dead child.	Child, ♂, very large and edematous; some endocarditis in right ventricle. Placenta very large and edematous.
W. Fischer(19).....	25	v	Third child stillborn.	—	No edema; a trace of albumin; no casts. Spontaneous delivery; dead child.	Child, ♂, 41 cm. long, weight 1830 gm. Moderate general edema, enlargement of spleen and liver, many small hemorrhages of spleen, liver and kidneys. Placenta, 1730 gm.; markedly edematous.
Case II.....	26	ii	.....	+	Edema of the legs, much albumin; a spontaneous birth followed by puerperal sepsis with recovery. Child dead.	Child, ♂, 45 cm. long. Enlargement of spleen, many small hemorrhages in kidney, spleen and liver. Placenta edematous, 1220 gm. General edema of the child.

Writer	Age	Para	Obstetric history	Wa-R.	History of present pregnancy	Pathology; fetus, membranes, placenta, etc.
King(20).....	32	x	First three children healthy, eighth healthy, the rest either stillborn or miscarriages or lived but a few days.	-	No edema, no albuminuria. Antepartum bleeding; spontaneous delivery of a dead edematous fetus.	General edema, features obliterated. Suprenals $\frac{3}{4}$ in. long; both cortex and medulla were disorganized; marked small round-cell infiltration. Other organs normal. Placenta large, white and friable.
King(20).....	29	ii	First child syphilitic, second died at three months.	+	Spontaneously delivered of a living fetus, which immediately died.	Fetus generally edematous, more marked in abdomen and legs. Subcutaneous hemorrhages were present. Placenta normal; cord edematous.
MacWalters(21).....	30	0	.....	-	Albumin and casts; delivered of a dead fetus.	Fetus generally edematous; heart, kidney and liver normal. Placenta soft, friable and enlarged.
Fleischmann and Wolff.(22)	27	iv	Two previous children stillborn and edematous; one not edematous lived twenty-four hours.	++	Normal amount liquor amnii. Spontaneous delivery. Child died in twenty-four hours.	General edema; many diffuse small hemorrhages. Hemorrhagic diathesis. Placenta 820 gm.; not remarkable.
C. Sauvage(23).....	44	iii	First child living and well.	-	Marked albuminuria; edema of lower limbs and abdomen. Difficult labor. Child died after a few breaths.	Child 3200 gm.; 46 cm. long. Marked general edema; organs show no change. Much edema of placenta.
C. Sauvage(23).....	31	i	First pregnancy terminated by abortion at three months.	-	Marked hydramnios, albuminuria, edema of legs and abdominal wall. Infant delivered with forceps; died after a few inspirations.	Child, weight 4880 gm. Marked general edema, liver and kidney congested, spleen hypoplastic. Placenta pale and edematous.

HYDROPS UNIVERSALIS FETUS.—Cases reported since 1901.—(Continued).

Writer	Age	Para	Obstetric history	W a. R.	History of present pregnancy	Pathology; fetus, membranes, placenta, etc.
Bourret and Lathoud. (24)	23	0	.....	+	Erysipelas, marked edema of the legs, and albuminuria; hydramnios. Spontaneous delivery. Child lived six days.	Child, ♂, marked edema. Liver showed sclerosis of portal spaces. Polycystic disease of the kidneys. Placenta normal, 720 gm.
Commandeur(25).....	24	ii	Both children living at birth, but dying within twenty-four hours of toxemia.	—	Albuminuria; spontaneous labor, but difficult. Child dead.	Child, ♂, weight 2250 gm. Enormous general edema of body and head. Suprarenals showed degeneration of medullary portion. Placenta edematous, enormous, weight 1560 gm.
O. Fischer(26).....	31	i	Normal labor; normal child.	—	Much pain in right side of abdomen; occasional slight bleeding from vagina; no varices or edema. Spontaneous delivery of a dead child. No hydramnios.	Fetus, 21 cm. long, weight 600 gm.; general edema, most marked in trunk and head. Kyphosis and scoliosis present. Placenta edematous, 500 gm.; cord also edematous and showed round-cell infiltration of its connective tissue.
White(27).....	33	x	One child well; one lived two years; four stillborn; four miscarriages.	—	Thirty-two weeks pregnant; edema of feet; no hydramnios. Spontaneous delivery. Child died in a few moments.	Child, ♀, 16½ in. long, 6 lb. General edema. Viscera were normal. Placenta very large, weight 3 lb. 9 oz. Villi edematous.
W. Lahm(28).....	23	0	.....	++	Eight months pregnant; labor spontaneous. Child died immediately after birth.	Child, ♂, 36 cm. long, 1500 gm. General edema. Liver and spleen much enlarged; the liver showed a marked, mixed-cell infiltration as did the spleen and kidney. The cells were mostly erythroblasts, myeloblasts and myelocytes. Leukocytes were practically absent. Placenta edematous, 750 gm. Spirochetæ were demonstrated in the liver.

Writer	Age	Para	Obstetric history	W a. R.	History of present pregnancy	Pathology; fetus, membranes, placenta, etc.
Rautmann(29).....	33	v	Three children living, second child stillborn; third child died in three weeks.	—	Edema of legs, headache, and nose-bleed; marked albuminuria; many casts. Spontaneous birth of dead child.	Child had enormous general edema; weight 2530 gm. Liver, spleen and kidney showed a massive growth of large lymphoid cells. There were degenerative changes in the erythrocytes.
Schridde(s)	32	vii	Four normal births, then three macerated children in succession.	..... —	Eight months pregnant. Albuminuria and edema of the legs. Spontaneous delivery of a dead infant.	Child showed some liver changes, marked icterus, general edema. Placenta and cord edematous.
Case II.....	28	iv	Children living and well.		Albuminuria; no edema. Placenta previa (seventh month).	Child, ♂, 32 cm. long, 1100 gm. Much general edema. Liver, weight 130 gm. and showed brownish pigmentation. Placenta edematous.
Teuffel(30).....	30	Mult.	.....	.....	Much icterus and edema. Delivered spontaneously at sixth month.	Child generally edematous except hands and feet, which were normal in size. Placenta enormously edematous.
Leiven(31).....	29	v	Former pregnancies normal.	—	Suffered from marked albuminuria and edema of the legs and vulva. Large hydramnios. Difficult labor; dead child.	Child, ♀, enormous, general edema. Organs normal, except kidneys, which showed an acute nephritis. The huge placenta was edematous, weight 1900 gm.
Davies(32).....	30	v	Two children dead of pneumonia; one of jaundice; one stillborn.	—	Varicose veins, edema, hydramnios; dead child.	Child, ♀, 17½ in. long, 7¼ lb. Marked general edema; spleen enlarged two and one-half times normal size. Placenta edematous and showed vascularity of villi.

HYDROPS UNIVERSALIS FETUS.—Cases reported since 1901.—(Concluded.)

Writer	Age	Para	Obstetric history	W-a-R.	History of present pregnancy	Pathology; fetus, membranes, placenta, etc.
Nyhoff(33).....	History wanting.	—	.....	Massive general edema; high leukocytosis. Placenta edematous, weight 1240 gm. Cord edematous.
Case II.....	History wanting.	.....	.....	A macerated, premature child, very marked general edema. Organs normal. Placenta weighed 1080 gm.; many necrotic villi.
Case III.....	History wanting.	.....	.....	Stillborn ♀ of 1800 gm. General anasarca of moderate degree. Heart unusually small and with the liver showed some round-cell infiltration. Placenta enlarged, not otherwise abnormal.
Case IV.....	+	Mother had some edema during pregnancy.	Premature ♀, marked anasarca, weight 2300 gm., spleen and pancreas showed hypertrophy of the connective tissue. Placenta weighed 900 gm.
Case V.....	—	No edema during pregnancy; very marked hydramnios. Child lived twelve hours in an incubator.	Premature ♂, weight 1640 gm. Marked general edema. The liver was enlarged. Placenta thick and pale.
Case VI.....	—	Mother had edema of legs, albuminuria, hydramnios. Child lived eighteen hours.	Child, ♀, 2920 gm. Marked general edema. Organs showed no lesions. Placenta not edematous.
Case VII....	—	Mother was well, no edema nor albuminuria.	A dead ♀, 2020 gm. Anasarca of head, trunk and thighs. A sarcoma involved the intestines, pancreas and left kidney. The liver and gall-bladder were free. Placenta edematous, 980 gm.

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRI- CIANS AND GYNECOLOGISTS.

*Proceedings of the Twenty-eighth Annual Meeting held at
Pittsburgh, Pa., September 14, 15 and 16, 1915.*

The President, CHARLES L. BONIFIELD, M. D., in the Chair.

(Continued.)

A CONTRIBUTION TO THE CONSERVATIVE SURGERY OF CHRONIC INTESTINAL STASIS.

BY

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M. R. C.

(With illustrations.)

WHEN the subject of chronic intestinal stasis first seriously engaged the attention of the medical profession of this country, it had been presented in a way which suggested very simple diagnostic measures and definite surgical relief. A patient who showed signs of intestinal toxemia was sent to the röntgenologist. If the radiographs showed bismuth in the ileum after eight hours or more, or in the colon after eighteen hours or more, chronic intestinal stasis was said to exist. A marked sagging of the transverse colon, in addition, greatly diminished the chance of relief by medical means. If, after a trial of exercise, an abdominal support, massage, a selected diet and paraffine oil, there was no decided improvement, a short-circuit, with or without a colectomy, was to be done. Within a short space of time much was written and a considerable amount of radical surgery performed by a limited number of enthusiasts. When, however, the more conservative surgeons observed frequent unsatisfactory results in the hands of the well-trained operators and frequent disastrous results in the hands of those less skilled, they straightway gave voice to their observations with the result that many surgeons were literally frightened from further serious con-

sideration of the subject. A few adhered to the Lane technic; others sought to modify it. With a few exceptions, there is but little merit in the substitutes offered in lieu of the Lane ileocolostomy and colectomy, other than to further demonstrate the tolerance of the intestinal tract to abuse. After an apparent lull in the operative enthusiasm, considerable attention was given to debate on the etiology of the "bands," "folds" or "veils" which might be factors in causing intestinal stasis. The congenital, inflammatory and evolutionary theories all had warm advocates.

While the subject of intestinal stasis has received unwarranted surgical enthusiasm on the one hand, and, under the guise of scientific skepticism, has been scoffed at on the other, nevertheless the work

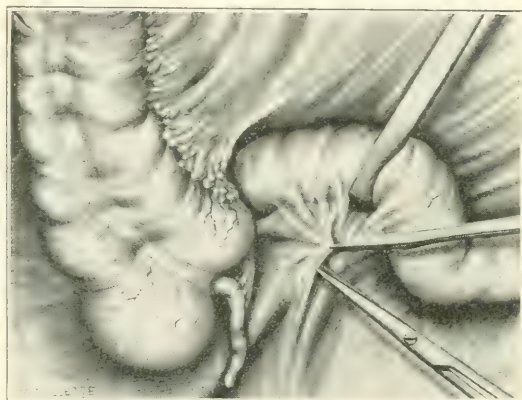


FIG. 1.--Technic of dividing ileopelvic band. Lifting with delicate forceps and nicking with blunt-pointed scissors.

that has been done has established facts of great value. It has become a recognized factor in the production of many pathological conditions. It has been learned that a definite time limit for the emptying of the small or large intestine cannot accurately determine the existence or nonexistence of intestinal stasis. Apparently healthy individuals may retain bismuth in the intestine many hours longer than others who show intense toxemia. The retention time in the same individual may be influenced by many circumstances and vary widely. A marked prolapse of the transverse colon has been demonstrated many times in individuals apparently healthy. In other words, the pathology of the condition is dependent upon the amount of toxic absorption that the slowing of the fecal current permits and cannot be determined alone by the time required by the

intestine to empty itself, inasmuch as the apparently normal emptying time varies so widely in individuals.

The definition of chronic intestinal stasis which came from London has not been improved upon, namely, that whenever the intestinal content is delayed sufficiently long (and regardless of the time, might be added) to permit the production and absorption of a greater amount of toxic material than the converting and excreting organs are able to deal with, intestinal stasis exists.

The x-ray is of greater value in determining fixed points and constrictions in the lumen of the gut than in giving information concerning the emptying time of the bowel. The existence of certain well-defined intraabdominal structures termed "bands," "folds" or "veils," which mechanically interfere with normal

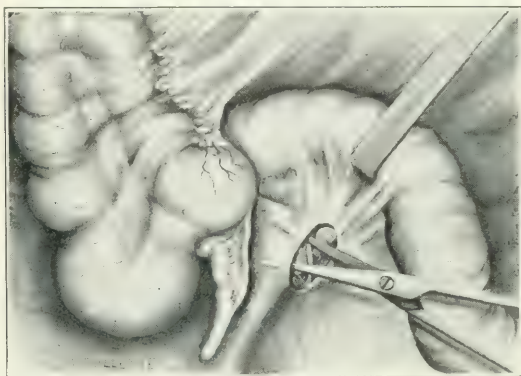


FIG. 2.—Separating cellular tissue from peritoneum, pushing veins out of harm's way before complete transverse division of band.

intestinal function, has been established beyond peradventure. Skepticism can only exist among those who have had no opportunity to observe them, or among those who stubbornly refuse to see them. The problem which confronts the practical surgeon to-day is not one which concerns the etiology of these structures, or an attempt to determine whether the toxemia is due to the chemical or the bacteriological intestinal content, or both, but rather how best to remedy the condition as it exists and to prevent recurrence. The operator should approach his case with an open mind and map out his procedure only in the presence of an open abdomen. The incision should permit an inspection of the entire abdominal cavity, the type which dislocates the right rectus and incises the peritoneum and posterior rectus sheath to the right of the midline, is preferable.

Exploration should start at the esophageal end of the stomach and the entire gastrointestinal tract should be examined. Any abnormality which might interfere with normal function should be dealt with at once. It is a waste of time and causes needless

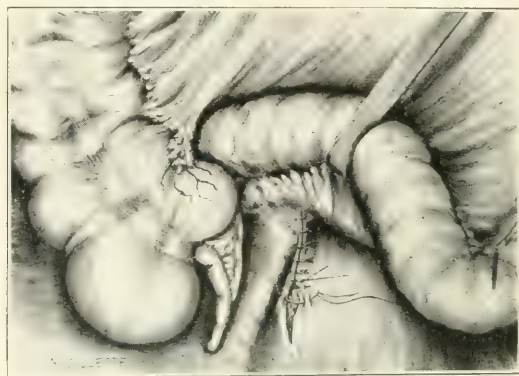


FIG. 3.—Insertion of sutures in a manner to invert edges of peritoneum. Interrupted stitches used to secure accurate approximation.



FIG. 4.—Dilated cecum with slight internal rotation and ileopelvic band. This type gives symptoms of so-called chronic appendicitis.

tissue handling to inspect the entire abdominal contents before beginning operative repair. Do not consider that every band or fold which appears abnormal should be divided; many of these adventitious structures, acting as accessory ligaments, are of decided

benefit to the individual. It is only when these bands are capable of forming mechanical obstruction to the involved organ that they should be interfered with. The operator must ever have in mind the interpretation of conditions not as they appear on the operating-table, but rather as they would appear were the patient in the upright position. Recalling the sites where normal fixation is most apt to occur, will aid systematic search. A band is frequently found extending from the transverse colon, over the transverse mesocolon, involving the pylorus or first portion of the duodenum and extending to the undersurface of the liver. Sufficient constriction or fixation of the pylorus may occur as to seriously interfere with its function. The gall-bladder and bile ducts may like-

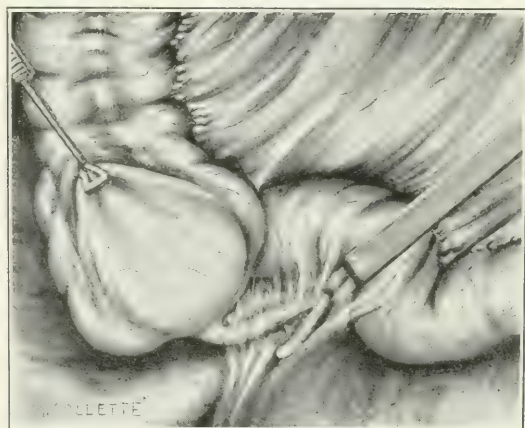


FIG. 5.—Dilated cecum retracted to show appendix involved in the ileopelvic band. The fixation of the cecum at its inner border favors internal rotation.

wise be functionally impaired by a band of this type. The second objective point should be the duodenojejunal angle. The normal curve may be replaced by an angulation so exaggerated as to interfere with the fecal current; this is almost invariably true in the presence of a dilated duodenum. After a rapid examination of the ileum, the next site meriting special attention is the ileocecal region. On the undersurface of the mesentery a few inches from the terminal ileum, converging white fibers may frequently be seen which unite to form a distinct band which extends downward and blends with the peritoneum of the pelvic floor. This band may cause a condition varying from a moderate fixation to an extreme deformity of the ileum. The appendix is often firmly secured by these fibers

just described, in various positions to the undersurface of the terminal mesentery or to the cecum. Fibers found on the upper mesenteric surface or others extending over the cecum may elevate and fix the appendix over the gut, thus causing a certain degree of obstruction. Again, strong bands may develop between the cecum and ascending colon and adjacent wall in such a way as to produce a deformity of the colon. The splenic and hepatic flexures of the colon may show angles exaggerated and fixed to a degree sufficient to render the passage of the fecal current difficult. A redundant pelvic colon is frequently attached to the left lateral

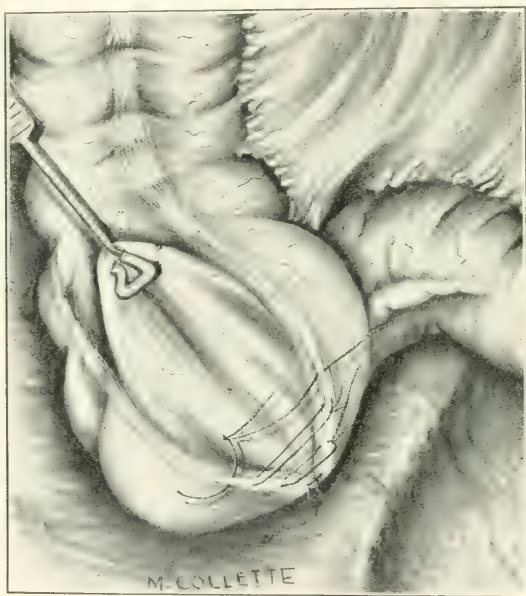


FIG. 6.—Cecal plication. Interrupted stitches passed through one-half of the longitudinal band to avoid strangulation.

wall by bands which form on the outer side of the mesocolon. These may be sufficiently developed to fix this portion of the bowel in a loop or series of loops and narrow its lumen at the fixation points. An extension of this same group of bands may distort the rectum and fix it more or less firmly in a series of pouches.

Unfortunately, there appears to be a growing tendency in the profession to associate the surgery of intestinal stasis with one of two procedures—either an ileocolostomy or a colectomy. Much has been written on the radical surgery but the therapeutic possibilities of conservative plastic surgery has received but little attention.

The principles of repair consist in relieving fixation of the gut, and covering over all denuded areas with peritoneum. Fixation bands are



FIG. 7.—Insertion of "Y" sutures at upper limit of plication to prevent formation of a diverticulum.



FIG. 8.—"Y" stitch complete. Securing point of union of the three longitudinal bands over appendix stump to peritoneum to prevent internal rotation and form point of countertug for the longitudinal muscle bands.

divided transversely and sutured longitudinally, the peritoneal margins being inverted. The band to be divided should be picked up by

delicate forceps, the peritoneum nicked with blunt-pointed scissors and the cellular tissue and any underlying blood-vessels pushed out of harm's way before the band is completely divided. Very fine round needles should be used, threaded with fine paraffined linen, the oil allowing the thread to be passed with the minimum amount of tissue trauma. It is obvious that only the principle of the repair technic can be given for the disposition of these bands; each case is a problem in itself and frequently taxes the skill and ingenuity of the operator to the utmost. When the gut is secured by several bands forming a fixation area with a broad base, the repair is much more difficult. When the denuded area cannot be covered by peritoneal plastic flaps, a portion of the greater omentum may be utilized, detached only if a drag is made on the transverse colon when the omentum is placed



FIG. 9.—Radiograph of patient in upright position showing dropping of transverse colon and cecum over diverticulum.

in position to cover the raw surface. A piece of superficial fascia with a small amount of adherent fat has been stripped from the thigh and used with success. When the operator meets an extreme condition of intestinal fixation in which conservative plastic surgery is sufficient, then more radical measures must be considered, but that is beyond the scope of this paper.

It is to certain pathological conditions found in the ileocecal region that I wish especially to call attention. The ileopelvic band is of common occurrence, easily recognized, and usually presents no great difficulty in its repair. This technic is best shown by the illustrations.

Another condition frequently found is the dilated and axially rotated cecum. The toxic individual is poor in muscle tone, and the muscle fibers of the cecocolon are under more strain than those of any

other portion of the intestinal tract, in having to work against gravity on an average of eighteen hours a day, until the effluent has rounded the hepatic flexure. A frequent result of this strain is the stretching of the cecal musculature, the dilated cecum thus gets its start. When the mesial border of the cecum is more or less fixed and the free outer border rests upon the inclined plane of pelvic peritoneum, the mechanical conditions are such that any increase in the size of the cecum must tend toward an internal rotation. This is aided by the intraabdominal pressure. The appendix, which is frequently involved in the bands attached to the cecal border, is often atrophic

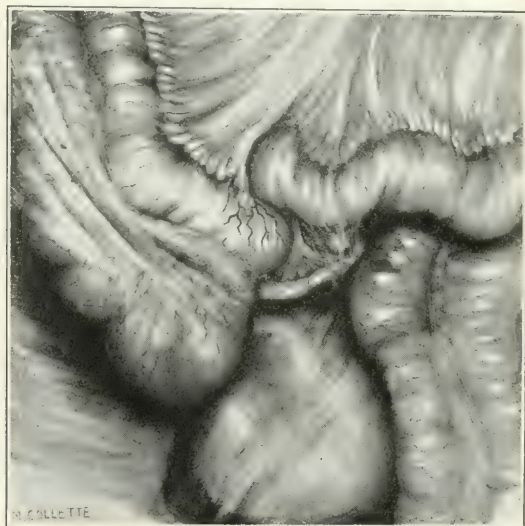


FIG. 10.—Cecal diverticulum.

from constriction. After carefully observing over fifty cases operated upon during the past year, the writer is convinced that the symptoms of a very large percentage of cases, diagnosed as and operated upon for the relief of a chronic appendicitis, are in no way due to an inflamed appendix, but are due rather to a cecal volvulus of varying degree. When the muscle fibers of the cecum have become attenuated, under proper conditions an acute dilatation may take place. When the mechanical conditions are favorable, as previously mentioned, the greater the distention, the greater the internal twist. This condition will produce pain, vomiting, local tenderness, muscle rigidity, rise of temperature, increased heart action and a moderate polynuclear leukocytosis. These attacks from

the nature of the condition are apt to be recurrent. In the fifty cases previously alluded to, each gave such acute symptoms in varying degree; from each was removed a macroscopically normal appendix and each possessed a dilated and axially rotated cecum.

The technic employed for the relief of this condition consists in freeing the fixation bands in accordance with the principles previously mentioned, removal of the appendix, plication of the cecum and a fixation of the external longitudinal band to a flange of parietal peritoneum picked up from the right lateral wall. The details of this technic are illustrated.

It occasionally happens that in the process of development the

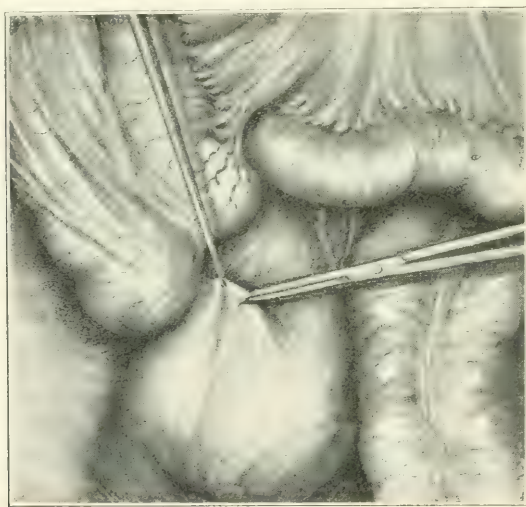


FIG. 11.—Appendix removed, ileopelvic band divided showing raw surface. Picking up peritoneum from base of sac.

cecum is not suspended as a pouch invested with peritoneum, but is attached to the posterior abdominal wall by two lateral layers of peritoneum which do not meet posteriorly. The cecum is thus held in a sort of pocket of peritoneum between layers of a mesocecum. When a cecum of this type begins to dilate, the greatest stretching occurs in the direction of least resistance which is downward in the loose cellular tissue under the pelvic peritoneum. There is thus created a cecal diverticulum which may harbor fecal material for a very long period. Having observed eleven such cases during the past year in which there was a bismuth retention of from three to fifteen days, two facts are in evidence; first, the condition cannot be

extremely rare but has been overlooked; second, it merits surgical consideration. The technic employed for the repair of this type of cecal diverticulum has been used successfully in all instances, and to the best of the writer's knowledge, has not previously been described. The details of this technic are best shown in the illustrations.

Still another pathological condition occurs in many cases of intestinal stasis, especially in the presence of a dilated cecum, namely, an incompetent ileocecal valve. A number of operations have been



FIG. 12.—Separating peritoneum from raw surface of gut.

suggested for the reconstruction of this valve, the underlying principle of each being a tucking-in of the tissues at the ileocecal junction, thus lengthening the old or creating new valve flaps. The competency or incompetency of the ileocecal valve depends far more upon the tone of the circular muscle fibers in the intestinal wall than upon the length of the membranous flaps. When an incompetent valve is rendered competent by invagination of the tissues external to the valve, it is accomplished by both a constriction of the gut and by a blocking of its lumen by the invaginated tissue. The pro-

cedure then is wrong surgically as well as mechanically and may thwart the accomplishment of the very object for which the operation was undertaken, the point of obstruction being merely transferred from the original site to that of the ileocecal junction. The fact that the ileocecal valve is regularly incompetent in the cadaver and in all dead animals is evidence sufficient to demonstrate that the ileocecal valve is not a perfect valve mechanically but must depend largely for its competency upon the tone of the sphincteric muscle fibers. The cure then of an incompetent ileocecal valve must depend upon a restored muscle tone, which is to be accomplished by the relief of any mechanical obstruction to intestinal drainage and a special hygienic régime. Having seen two instances in which an incompetent valve became thoroughly competent in less than three



FIG. 13.—Insertion of invaginating stitches in muscularis of gut.

months, valves untouched at operation, and the competency subsequently tested in the *x-ray* laboratory, I am convinced that, under proper conditions, an incompetent ileocecal valve may again function normally.

The problem of preventing the formation of postoperative adhesions appears to be ever with us. To minimize the likelihood of adhesion formation there should be the least possible amount of tissue trauma. Handle the organs as little as possible and when so doing use the utmost gentleness. Make use of an exaggerated Trendelenburg position and allow the intestine to gravitate out of the pelvis rather than pack it out of the way with numerous gauze pads. An excellent method is to make use of a piece of heavy oiled

silk which when boiled is very soft and slippery. This is placed against the intestine and the gauze pads spread against the silk. The most satisfactory foreign material I have left in the abdomen is sterile neutral mineral oil; before closure of the abdomen it is a routine to coat all sutured surfaces with it.

Assuming that all mechanical interference with the normal function of the intestinal tract has been relieved by operation, well may the question be asked, "If the conditions which brought about the formation of these bands be still present, what is to prevent their reforming?" Where the surgeon considers his task finished with the closing of the abdomen, the results of intestinal stasis surgery are apt to be disappointing. It should be explicitly stated to each patient that the operation itself does not effect a cure, but it gives the opportunity for a cure to be brought about which did not pre-

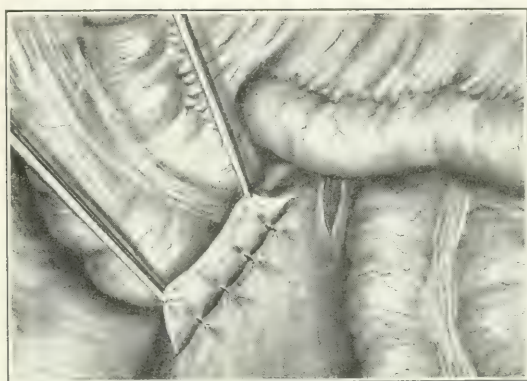


FIG. 14.—First row of peritoneal stitches. Method of overlapping redundant peritoneum.

viously exist. Efforts to prevent the recurrence of the abnormal conditions should start as soon as the patient leaves the operating room. The posture in bed should be such as will bring the least possible strain upon the repaired structures. In the absence of definite contraindications, the foot of the bed is elevated and the patient turned slightly on the right side. On the second day 2 drams of a good mineral oil are given every two hours until it passes through the rectum. If no oil is passed in forty-eight hours, ten drops of castor oil is added to each dose of the mineral oil and increased ten drops a day until the bowels move. The castor oil readily mixes with the mineral oil if the latter is slightly warmed. No other cathartic need be given and violent peristalsis is avoided. The amount may then be modified to meet the requirements of the individual in keep-

ing the fecal current soft. The diet for a number of weeks should consist of such food stuffs as leave the least amount of undigested residue. A rigid general hygienic régime is outlined, not overlooking the fact that these patients require more sleep than average individuals. When the abdominal muscles are weak and flabby, an abdominal support is advised, the patient being impressed with the idea that this is to be discarded at a later date when the abdominal muscles have become sufficiently strengthened to give a proper support. The Curtis Spring Support may be best in principle but having had such difficulty in inducing patients to wear it, I now make use in women of a good surgical corset, and in men a support constructed on the principle of the Mosher belt.

The regulation of active and passive exercise is most important. When the patient can afford it, the first week after leaving the



FIG. 15.—Operation completed.

hospital, passive exercise is given every second day by a masseur especially trained in this type of work. When patients cannot afford a trained attendant, demonstrations in abdominal massage are given, to be performed by some member of the family, or, if need be, by the patient himself. The importance of continuing this is emphasized until informed that such manipulations are no longer necessary. Active exercise is regulated and insisted upon.

The study of intestinal stasis is in its infancy, it is a complex subject and must needs be considered from many viewpoints. Its surgery is comparatively new, is alluring and presents great possibilities. Attention must not be centered on any one corner of the abdomen, but the drainage scheme considered as a whole.

The conscientious surgeon must work at this problem from the

conservative side, aiming to determine how little can be done to restore this patient to health, rather than allow himself to be puffed with pride over the fact that, having had his colon removed, his patient still lives.

220 WEST SEVENTY-NINTH STREET.

OBSERVATIONS ON MALIGNANCY OF THE UTERUS.¹ DEMONSTRATION OF SPECIMENS.

BY

X. O. WERDER, M. D., F. A. C. S.,

Pittsburgh, Pa.

(With six illustrations.)

Specimen No. I (Fig. 1).—Dermoid cyst with balls or concretions of sebaceous material.

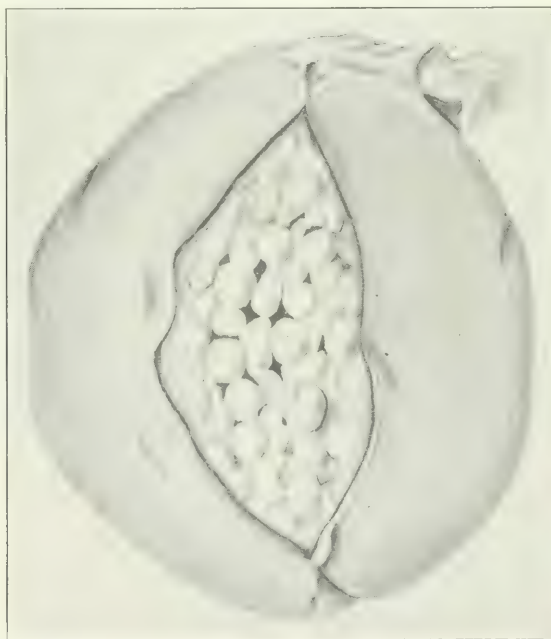


FIG. 1.—Dermoid cyst with fatty concretions.

Mrs. C. E. R.—Operation March 18, 1911. Right salpingo-oophorectomy and appendectomy. Dermoid cyst size of an infant's head with torsion of the pedicle. Intestinal and omental adhesions. Specimen is of interest on account of its containing innumerable balls or concretions of a sebaceous character, ranging from the size of a pea to a marble, and independent of each other. The case was

¹Read before the American Association of Obstetricians and Gynecologists at Pittsburgh, Pa., September 15, 1915.

described by Dr. J. W. McMeans in the *AMERICAN JOURNAL OF OBSTETRICS*, vol. lxx, July, 1914. The cause of the peculiar formation is rather obscure, but in all cases in which the condition was found, an inflammatory condition was present.

Specimen No. II (Fig. 2).—Fibroid tumor of the uterus and dermoid cyst of the right ovary with almost complete calcareous degeneration of its wall.

Miss I. B. F.—Operation January 8, 1915. Fibroid tumor of the uterus and calcareous dermoid of right ovary. On account of the calcareous degeneration of almost the entire cyst wall, forming a complete shell, this specimen is of unusual interest.

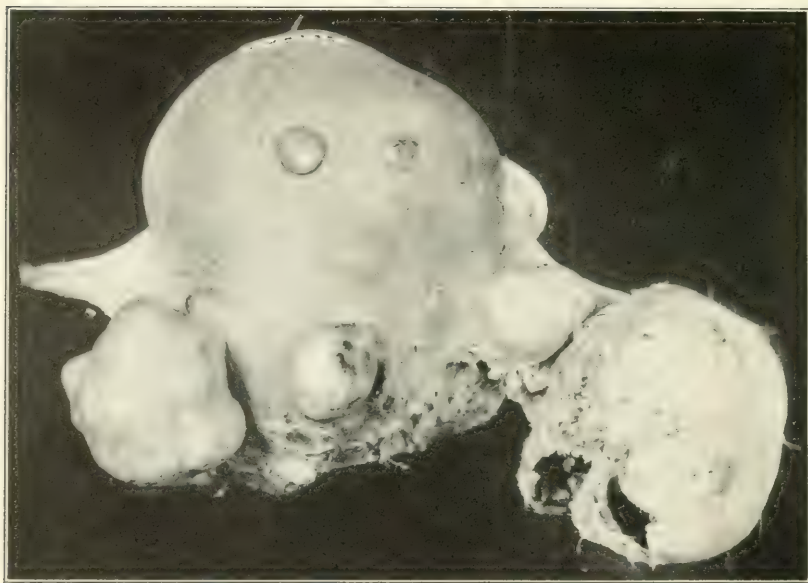


FIG. 2.—Fibroids of uterus and dermoid of right ovary with complete calcification of cyst wall.

Specimen No. III (Fig. 6).—Ectopic gestation of four and one-half months' duration. Operation May 13, 1915.

Mrs. J. V., aet. thirty-three, married fifteen years, two children, the last was stillborn at the eighth month, eight years ago. Has not menstruated for four and one-half months. Four months ago the patient had sudden and violent pain in lower abdomen which confined her to bed for one week. Two weeks later she was compelled to go to bed again and remained there for six weeks. She complained of a feeling of weight in lower abdomen. Since then she felt well until a few days prior to the operation when she experienced moderate hemorrhage from the uterus and pain.

Operation—The conditions by which I was confronted necessitated a hysterectomy and bilateral salpingo-oophorectomy. The

pathologic conditions consisted, on the right side, of an extra uterine pregnancy of about four months' development. A female fetus was found deep in the culdesac; its head was so firmly adherent in the pelvic cavity that during its delivery the skin of the scalp and forehead was almost entirely torn away and its neck badly lacerated. The gestation sac, which included the tube, was the size of a large grape-fruit. For 2 inches the proximal end of the tube was thickened and patulous. The sac had ruptured low down posteriorly, and through this opening the fetus had been extruded into the abdominal cavity where it was found among the intestines. The placenta had a tubal attachment. The uterus was enlarged, soft and displaced to the left. Left uterine adnexa were markedly distorted by a large cystic tumor posterior to the

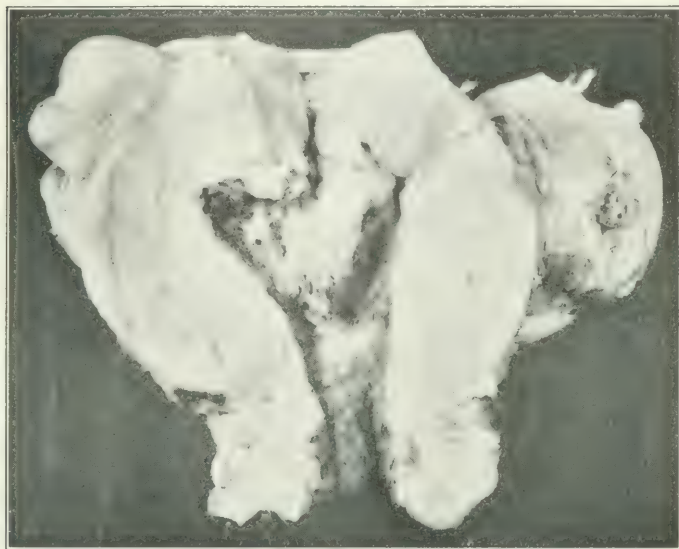


FIG. 3.—Carcinoma of corpus uteri and hydrosalpinx.

broad ligament. This contained bloody fluid, probably a hemocele resulted from the primary rupture. The left tube was greatly elongated and the ovary deeply imbedded in adventitious tissue. The intestines and omentum were firmly adherent to the sac, hemocele and in part, to the fetus.

Pathologist's Report.—A uterus with an enormously enlarged Fallopian tube representing four and one-half months' tubal pregnancy on one side, a fetus, and the adnexa of the opposite side. The gestation tube measured 13 cm. in length, 15 cm. in depth, and 8 cm. anteroposteriorly. The fetus measured 25 cm. in length. The umbilical cord was 40 cm. long. Uterus measured 7.5 in length, 7 cm. from horn to horn, 3.8 cm. in thickness. The left tube, like the right, was 13 cm. long and 1.4 cm. in diameter at the ampullar

portion. The left ovary measured 5 cm. by 2.5 cm. by 5.1 cm. The ectopic tube was a very large, solid, globular mass, presenting a ragged, intensely congested, outer surface which was covered by numerous fibrinous and fibroid tags, bands and strings of lacerated adhesions. The tube was torn in its lower region showing a very ragged rent, forming a rough and oval opening of 6 cm. by 5 cm. Protruding from this tear was the small umbilical cord and shreds of fetal membranes. The lower thick edge of the rounded, reddish placenta also projected a little beyond the ragged margin of the tear. The umbilical cord, 40 cm. long and 5 mm. in thickness, was almost



FIG. 4.—Carcinoma of corpus uteri with fibroids and simple cyst of ovary.

entirely outside of the gestation sac. The cord was torn transversely. A large oval window 6 cm. by 5 cm., with the flap turned down, was situated about the center of the posterior surface of the tubal sac, and showed a large placental mass, and fetal membranes.

At the operation the fetus was found free within the pelvic cavity, bound down at the head, and very much distorted; though all of its parts were quite distinct. Its neck was badly lacerated; the skin of the scalp and forehead were almost entirely torn away. Over the back of the head, the shoulders and the abdomen, there were numerous and firm adhesions. The fetus was rather well developed,

but much distorted; its face looked congested, as though contused, especially on the right side.

The posterior surface of the uterus was covered by broken-up adhesions. The uterine cavity was patent and slit-like, showing a mucosa of a light yellowish-brown color. The left adnexa were covered by a very tough, quite thick, blood-stained and ecchymosed fibrous membrane, the remnant of a hematocele; it was a torn, but large sac-like pouch, which was torn and covered all of the posterior and small part of the anterior surfaces of the ovary. The fimbriated extremity of the tube formed part of this sac-wall, was seen to open on its outer side and showed a wide patent mouth with distinct fimbriae knitted together.

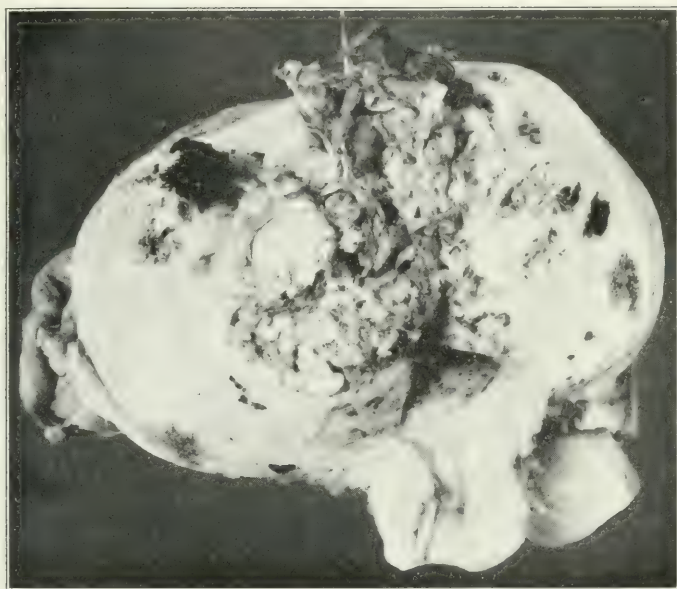


FIG. 5.—Sarcoma of corpus uteri with calcareous infiltration of malignant mass and fibroid.

General Remarks on Malignant Neoplasms of the Uterus.—We have recently looked over our cases of malignant disease of the uterus with a view to determine, if possible, the relative frequency of sarcoma and carcinoma of the body of the womb and that of the cervix. Of 220 consecutive cases of malignancy, we have found twelve cases of sarcoma of the uterus, or 5.4 per cent. The proportion, ordinarily given, is from 2 to 3 per cent. Of the 208 cases of carcinoma of the uterus, 152 were carcinoma of the cervix and 56 carcinoma of the body of the uterus, or 26.9 per cent. The number of cases of malignant diseases of the body of the uterus was

68 or 30.9 per cent. This would verify a contention, made some time ago; first, that sarcoma is more frequent than is usually supposed; and second, that the proportion of carcinoma of the body to that of the cervix is much greater than is generally given. Many of our text-books give the proportion from 1 to 8 or 1 to 12. In

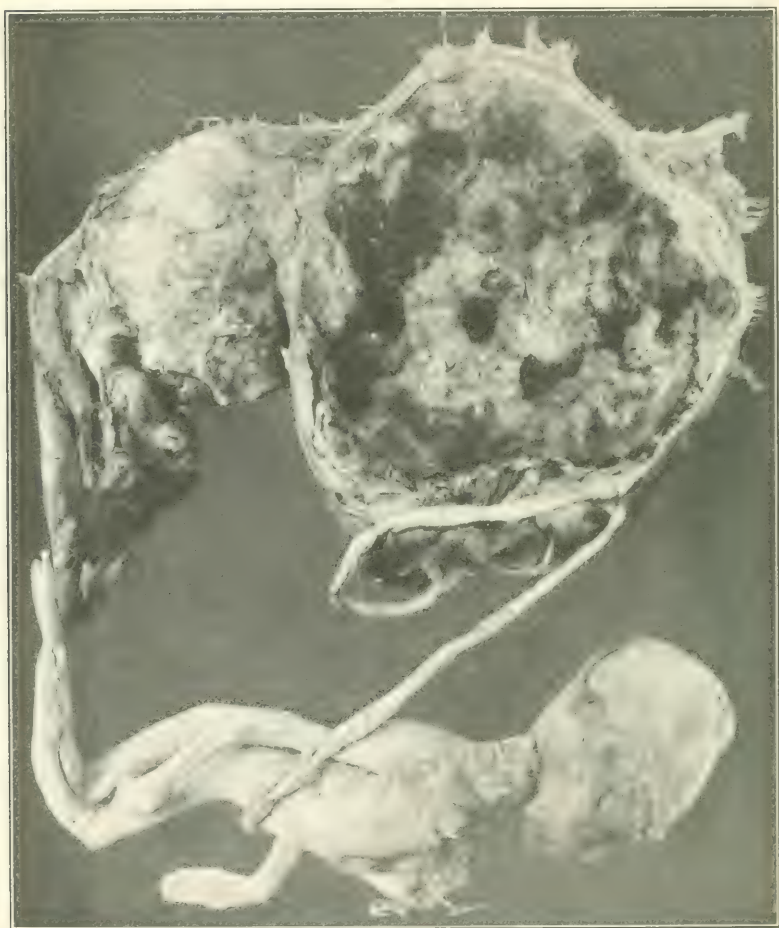


FIG. 6.—Ectopic gestation of four and one-half months.

our experience, the proportion is almost 1 to 4. This list does not include some late cases in which it was impossible to decide the starting-point with absolute certainty.

The complication of fibroid with carcinoma and sarcoma has been so frequent in our experience (I am not prepared, at this moment, to give the exact proportions) that I have made it a rule for

a number of years, especially in women past the climacteric age, to either curette or, of late years, to open the cavity of the uterus to make sure that no malignant complication exists.

In specimen XI, Fig. 4. School teacher, virgin, forty-six years old, this precaution for some reason was omitted and a supravaginal hysterectomy made. After the completion of the operation the specimen was opened and well-developed carcinomatous change was found in the fundus. It was too late to remove the cervical stump. The case has, however, been carefully watched since the operation. A year has elapsed since then without new evidence of the disease. Fortunately the malignant neoplasm was a considerable distance away from the cervical stump which was left in this patient. This experience emphasizes the point brought out above, that is, to make it a rule to *examine the uterine cavity in all women in whom a hysterectomy is made for fibroids and who are near or within the climacteric age, before closing the peritoneal cavity.*

Specimen No. IV (Fig. 5).—Sarcoma of corpus uteri and fibroid. From Miss S. P., aet. sixty-five. Operation March 19, 1915. Uterus size of grape-fruit, its cavity filled with large amount of necrotic malignant tissue. In the center of this mass was a hard calcareous spot. The sarcoma seems to have had its starting-point in the fibroid.

Specimen No. V.—Carcinoma of corpus uteri. Mrs. E., aged forty-eight. Multipara. Operation January 31, 1913.

Specimen No. VI.—Carcinoma of corpus uteri. Mrs. W., aged fifty-eight. Multipara. Operation May, 1913.

Specimen No. VII.—Carcinoma corpus uteri. Mrs. B., aged fifty-six. Never pregnant. Operation September 9, 1911.

Specimen No. VIII.—Carcinoma corpus uteri. Mrs. P., aged fifty-six. Multipara. Operation February 1, 1915.

Specimen No. IX (Fig. 3).—Carcinoma corpus uteri. Mrs. H., aged forty-six. Operation September 3, 1915.

Specimen No. X.—Carcinoma corpus uteri and ovarian cyst. Mrs. B., aged fifty-three. Never pregnant. Operation August 7, 1915.

Specimen No. XI (Fig. 4).—Carcinoma corpus uteri with fibroid and simple cyst of ovary. Miss C., aged forty-six. Virgin. Operation October 31, 1914.

Operation.—Abdominal hysterosalpingo-oophorectomy.

Pathological Report.—Fibroid of uterus size of an orange, composed of two small fibroids. Cyst of left ovary size of lemon filled with bloody fluid. On section; carcinoma of fundus was discovered on posterior wall of fundus, covering the area of a silver dollar and extending about 1 cm. into muscularis wall.

Specimen No. XII.—Carcinoma and fibroma of corpus uteri. Mrs. M., aet. fifty-one. Multipara. Operation September 18, 1914.

For last two years almost constant bleeding. Malignant mass

situated in posterior wall and involving almost the entire uterus and extending through to serosa at a point near the right cornu. Several enlarged glands in right pelvic wall were removed and showed metastatic carcinoma.

AN UNUSUAL CASE OF MYOFIBROMA, COMPLICATING PREGNANCY.

BY

JOHN NORVAL BELL, M. D., F. A. C. S.,
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(With one illustration.)

MRS. S., aged thirty-one, married four years. Six months after marriage aborted when pregnant three months. I saw her in consultation the latter part of January of this year; found her six and one-half months pregnant, suffering from severe abdominal pain for about two weeks, the last week of which she had been confined to bed and required opiates to relieve the pain. Her temperature varied between normal and $100+^{\circ}$ F. Pulse 80 to 86, fairly good volume. There was tenderness on pressure over the entire abdomen, but more marked in the right lower quadrant; no rigidity of the



FIG. 1.—Leiomyofibroma.

abdominal muscles; urine normal. The blood showed a slight leukocytosis characteristic of the latter half of pregnancy. Hoping gestation might be continued until the child was viable, operative treatment was postponed. She was advised to remain in bed and opiates ordered to be given as required. After two days and nights of this treatment the pain became so severe that every breath she took "cut like a knife." The pain was so great that she willingly consented to an exploratory laparotomy.

The abdomen opened a spot, 4 to 5 cm. in diameter and of the appearance of raw beef, was observed upon the anterior surface of the uterus near the right cornua. The growth was even with the uterine surface, eroded, and seemed to penetrate the uterine

wall to the endometrium. Adhesions were absent opposite or near the tumor. Enucleation was attended with some difficulty. The tumor did not have a well-defined capsule as we observe in the ordinary small potato-like uterine fibroids. The hemorrhage was easily controlled and a very satisfactory closure of the opening obtained. There was no apparent shock following the operation; and that evening we were very hopeful that the pregnancy would not be disturbed. During the night, however, labor pains developed and the patient promptly miscarried. Recovery was uneventful.

The pathologist, Dr. Wittwer, who examined the specimen, reports as follows:

"Specimen presented for pathological examination is a tumor, oval in shape, 5.5 cm. long and 3.2 cm. in diameter at its widest point. At the narrowest point was a pedicle by which it had been attached to the uterus. On median section, the outer portion of the tumor appeared pale and very firm; the inner portion of it was soft, boggy and very vascular. The vascularity, apparently, originated from the pedicle; the central portion of mass closely resembled a piece of raw beef. On the upper and outer surface of the tumor was a denuded area which appeared, as though having been adherent to some other structure; the microscope, however, showed nothing more than a mild inflammatory reaction. Pathologic diagnosis; hyaline leio-myofibroma. No evidence of malignancy."

The intensity of the pain was the most prominent symptom in the clinical history of the case. At first I was inclined to regard the symptoms as not serious; but the limited excursions of the diaphragm, the great suffering the patient endured when attempting to change posture in bed, finally determined me to adopt radical measures for her relief, in spite of the fact that she was anxious to become a mother.

The accompanying cut illustrates the bisected specimen.

DISCUSSION.

DR. FRANCIS REDER, St. Louis, Missouri.—This is an unusual case. A tumor may give its clinical evidence at the beginning of impregnation. The rapid growth, of both tumor and uterus, adds greatly to the patient's discomfort, and the frequent occurrence of paroxysmal pains denotes the tendency to abortion. Under the circumstances the doctor is not to be criticised for pursuing the course he did. Entertaining the most conservative views of the management of fibroids a myomectomy in a pregnant subject is considered by many an unjustifiable procedure. This case terminated very happily. Should an abortion follow a recent myomectomy there is not only the danger of hemorrhage, but the great danger of the giving way of sutures, causing serious consequences.

DR. ABRAHAM J. RONGY, New York City.—Pain associated with

a tumor or tumors of the pregnant uterus will depend upon the location of the tumor. If the tumor is a myoma and a large one which is likely to interfere with labor, then it should be removed, but there are many women who have fibroid tumors of the uterus without pain and have given birth to two or three children. If the myoma is situated near the submucosa it may be very painful. I recall one experience with a woman who had a tumor of the uterus. I suggested its removal, but she refused. This tumor became very painful, and she finally returned to have an operation performed. I examined her casually, knowing she had a tumor, but did not go definitely into the history. At the operation in removing the tumor I came across a pregnant sac. I sewed over the sac, separated the tumor from the uterus, and sutured the incised wound in the uterus. I think it is a better plan to suture with silk than with catgut on account of the point raised by Dr. Reder, that in case of abortion or infection the catgut ligatures may rupture and cause trouble. That woman went into labor, which was quite tedious, and gave birth to a stillborn child.

The question of myomas of the uterus associated with pregnancy is an important one. As long as the woman is well and there are no symptoms manifested from the existence of the tumor, the case should be let alone. Very often, however, a number of these women get excruciating pain on account of slight contractions which take place in the muscular coat of the uterus, pressing on the nerve filaments, and in such a case one is justified in removing the tumor.

DR. ASA B. DAVIS, New York City.—I have seen quite a number of cases of fibroid tumors complicating pregnancy. At our meeting held in Providence, Rhode Island, last year, I reported one of these cases where a fibroid tumor caused considerable pain, which was located in the posterior wall of the uterus, down near the cervix. It was about the fourth month of pregnancy. I removed this tumor successfully, the patient went on to full term, and was delivered without any untoward results.

I have seen five or six cases of fibroid tumor occluding the birth canal to such an extent that Cesarean section was apparently the only method by which these women could be delivered. These cases have all made good recoveries, and I have had no case in which I have found it necessary to remove the tumors. Unless there is some good reason and the tumor is situated so as to cause the patient danger, I believe they are much more comfortable by leaving them alone at the time of delivery. I have treated five or six such cases in that way, and with good results. These women can carry their tumors without any particular harm. One case I have reported in detail before this Association with a good deal of interest. She was a woman who had borne quite a number of children, became pregnant, and in the interval, or during the time the tumor was slowly growing it grew to such an extent that it completely blocked the pelvic canal.

Cesarean section was done, the cavity of the uterus was on the right side, the child was removed and when this was done the tension was found to be so great on the cavity of the uterus that it gave the sensation of snapping back like a rubber band. I believe a cross-section of that tumor would give us a concentric cavity. That patient was well for a while, and two years ago she had a bleeding, was having labor pains, and was within six weeks of term. She was an intelligent woman. This was the second time I expected to do a Cesarean section, and she was perfectly willing to remain in bed. She was kept in bed about five weeks, and when uterine contraction came on she had a small dose of codein, and when she was well we allowed her to get up. There was no examination made because we knew what the condition was, and I did not want to interfere with her in any way. One day, at the noon hour, when the membranes ruptured while she was walking about, she was hardly able to get around the table before she had a precipitate delivery. What happened there I believe was that in the course of her rest in bed the tumor, which was very large, had decreased in size, or the edema which might have been a large part of the tumor, had subsided and left room enough for the child to be delivered.

DR. ABRAHAM J. RONGY, New York City.—I fully endorse the statement made by Dr. Davis that when we are engaged in performing a Cesarean section we should do as little as possible. There is great danger in handling the intraperitoneal cavity, particularly in doing a hysterectomy following a Cesarean section.

During the past three months I have performed a Cesarean section for a fibroid tumor obstructing the lower pelvic canal. I removed the baby and left the tumor in. There are a number of fibroid tumors which occupy the lower segment of the uterus and a part of the cervix. In these cases it is impossible to remove them by supravaginal hysterectomy; it is necessary to do a complete hysterectomy which of course endangers the life of the woman. On the other hand, if the woman goes into labor the fibroid tumor of the uterus has to be watched carefully, for spontaneous rupture of the uterus may take place. I know of one patient who had two fibroids, one on the right side and one on the fundus, labor progressed normally without obstruction, but suddenly the uterus ruptured, the woman went into collapse, and we had to operate in a hurry. In a general way, I would say leave the fibroids alone while engaged in doing a Cesarean section, and the results will be very much better.

DR. FRANCIS REDER, St. Louis, Missouri.—The case that the essayist cited in which he succeeded in removing a tumor and not interrupting pregnancy is exceedingly interesting. Such an operative measure rests with the judgment of the operator. The size of the tumor and the time of pregnancy are important factors. If the tumor is discovered before the placenta becomes a separate organ, during the third month, it can usually be removed. There is great danger, of hemorrhage in removing these cervical tumors.

In the second case the doctor cited the surgeon had recourse to

abortive measures. This is a very serious procedure, as an abortion under such conditions carries with itself a high rate of mortality, three times greater than abortion caused by the mechanical action of the tumor. The procedure that Dr. Rongy has outlined here is probably the only one for the safety of the woman.

DISCUSSION ON THE PAPER OF DR. RONGY.*

DR. HENRY SCHWARZ, St. Louis, Missouri.—Before speaking on the points that the essayist wanted to limit the discussion to, I would like to say that when we took the work up last January we first tried to determine by animal experiments what the special dangers might be in both the use of scopolamin and the opium alkaloids. One of my associates and my son, Dr. Otto Schwarz, worked in the pharmacological department on dogs, and particularly dogs whose respiratory center they were able to control. It was shown then that the ordinary doses of scopolamin, such as are considered in twilight sleep, have no appreciable effect on respiration or on blood pressure. If the doses are pushed beyond that measure we get complete dilatation of the pupils, but otherwise we find no ill effects from the scopolamin. The opium alkaloids affected respiration in two ways. Our pharmacologist has shown that the opium alkaloids act directly on the muscles of the bronchioles, causing them to contract, causing bronchial constriction, and in that way interfering with the volume of air that passes to and from the lungs, and the other effect was on the respiratory centers, causing them to become partially or totally inadequate. We seemed to find that this effect was less marked under narcophin than it was under morphin. It is for that reason we used narcophin exclusively, but it is for that reason likewise we never repeated the dose of narcophin.

Furthermore, I want to say that in carefully studying the first publication of Gauss in 1906, I find he really brought out all these points to a nicety. Gauss has shown that the blue babies of which he complains were due altogether to the use of morphin. He then tried a series with opium alkaloids alone and got an increased number of blue babies. He tried a series with scopolamin alone in larger doses and got no blue babies, but got a few excited mothers, and for that reason he insisted on small initial doses of morphin.

Now, as regards the points brought out by the essayist, I will say that I fully agree with him in this, that scopolamin-morphin or narcophin anesthesia is a good addition to our obstetrical means of allaying suffering to child-bearing women. Anyone that knows the suffering associated with prolonged labor in some of the primiparæ, knows that we all, at different times, have tried certain means to allay these pains. We have used chloral hydrate, and we have used morphin injections, but we had to be sparing with the morphin injections on account of its antagonistic action to the labor pains. Since we have been using the pituitary preparations, that con-

* For original article see page 888.

traindication has disappeared, but on account of the fetal respiration, or on account of the difficulty of establishing fetal respiration after the larger doses of the opium alkaloids, we have to restrict the use of opiates in the parturient women. In selected cases, that is, in cases where labor is long enough to give scopolamin a fair play, Gauss calls attention to the fact that you must not force the method, but sneak in with small doses, repeated at reasonable intervals. It is a safe means if the ordinary precautions are observed. We have used it now since January, and we are using it right along in cases that are suitable. We have not had a large number of cases, perhaps seventy-five or eighty every week, and we have no reason for not using it in private practice. There is no reason why in a private home, with a trained assistant, and a good nurse skilled in the method, this means cannot be employed in a selected case as well as in a special room in a hospital.

The academic question which Dr. Rongy raised as to whether women seem to suffer pain or do not remember it, does not seem to me so vital. It is not the aim of this seminarcosis to have women not suffer, but it is to reduce the suffering. In an ideal case the woman continues to suffer, she is able to bear pain in order to assist nature. She must control the pain, as Dr. Rongy has pointed out, but she does not moan when the pain starts; she moans at the height of the contraction. The suffering is greatly reduced and she has no recollection that she has suffered. The fact that they do not remember it, and that they have no ill after-effects, would certainly seem to accelerate their recovery. In a good many cases we have observed after seminarcosis with scopolamin and narcophin, we have noted they made a quicker recovery; that is to say, the shock of a prolonged labor is greatly diminished, if not altogether avoided.

I agree with Dr. Rongy that it would be unfortunate to place this method in general use or have it abused. I agree with him also that we should be permitted to use it in our hospitals or in private practice as we use spinal anesthesia or any other well-established method, and I do believe that we ought to be given a little more time; that we ought not to be forced to come to conclusions and declare ourselves as to whether we are for or against the method. I find a great deal of good in the method, am using it, and shall continue to use it until, like other things, it is displaced by something better.

DR. MAGNUS A. TATE, Cincinnati, Ohio.—I do not feel that a subject of this nature before such an association should go by without some discussion by a number of the members present.

About a year ago I presented a paper before the Cincinnati Academy of Medicine on the so-called Twilight Sleep, at which time I presented my findings in nine cases. Since then I have tried it in four additional cases in private practice. In one of these the child died. Whether our technic was wrong or not is a question, but since that time I have not used it, and until better reports are given us I shall discontinue its use, and go back to taking care of our patients the way we did before when we had universally good results.

Some two years ago I collected the statistics of the Cincinnati Hospital obstetrical service for a period of twenty years, and during that time we had between 5000 and 6000 cases, and we use forceps in a little over 2 per cent. The morbidity was the equal, and our mortality was as low as any reports that I have been able to find in hospitals throughout the world, and I had occasion to look over very carefully these extensive reports.

Most of our modern text-book authors tell us that forceps should be used or are used in from 10 to 20 per cent. of the cases. If this so-called Twilight Sleep method is a good form of treatment, as Dr. Rongy says from his gathered reports (he sent out queries to be answered by physicians, and I got one of them and answered it), then undoubtedly there is merit in it in suitable or carefully selected cases in skilled hands. These queries were sent out to men who are doing obstetrics and gynecology as specialists—in fact, to the best men in the United States. The reports state that in 26 per cent. of the cases forceps were used. Even as is stated, the forceps were used many times simply to lift out the head over the perineum. This to my mind would be one serious objection against this method. Why were forceps used so often? Simply because, the men who were using this method were afraid that if they did not deliver the child in a certain time the child would be dead.

DR. ORANGE G. PFAFF, Indianapolis, Indiana.—I would like to ask the doctor how he accounts for even small percentage of mortality in infants? Could any of that be attributed to the use of the drug?

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—I am what you may call an outsider in obstetrics, consequently to me it is a matter of psychology. I have yet to see an enthusiastic article written on twilight sleep that did not come from a German. I have yet to see a large series of cases reported by an American. Most of the Americans, French, and people of that type, the so-called long heads, have had a dozen or two cases treated by this method and then they have stopped; and the roundheads, the Germans, who can study a diatom all their life, one might say, will put anything into twilight sleep.

DR. JOHN NORVAL BELL, Detroit, Michigan.—I have not very much to say on this subject, although I have had experience with fifteen cases. Of that number, I have seen one woman go into the most beautiful, quiet, semiunconscious sleep, have her baby without the use of forceps, and when she awoke afterward all that she remembered was that she had two pricks of the hypodermic needle. I have had in that same series of cases a woman who had identically the same treatment, who got and up and struck the nurse and walked around the room, we finding it difficult to control her. Now, I do not think it is as much a question of psychology as it is a question of the patient on whom you are using these drugs. Each of these women has some peculiarity, some peculiar resistance to the drug, and we cannot tell beforehand just how it is going to work. Other than that, my findings correspond exactly, in the small number of cases I have had, with those of Dr. Rongy.

DR. ADAM P. LEIGHTON, Portland, Maine.—My series of cases have been small. Thanks to the kindness of Dr. Rongy, I had the opportunity in New York of seeing and learning his technic. After I returned home I made use of it in a number of cases, and I can say truthfully that I obtained excellent results and there were no subsequent fetal nor maternal abnormalities. The mothers have all said that they would have their next baby in the same way. I used forceps more frequently in these cases than I do or would in a similar number of cases without scopolamin anesthesia.

DR. HALL.—Why did you use forceps?

DR. LEIGHTON.—Because the second stage was seemingly prolonged.

DR. ASA B. DAVIS, New York City.—I do not feel that I am competent to speak on this subject inasmuch as the experiments in regard to the use of these drugs in labor have been carried on in the Lying-In Hospital, New York, chiefly by Dr. Harrar and by Dr. McPherson, who presented their findings at the last meeting of this Association. I have been off duty during that time, partly from illness, and I have not seen very much of their actual work. What I have seen has not impressed me favorably. I know, however, that the object it was desired to obtain, has not been reached, and I believe they have decided on a recession in the use of these drugs. That there is some good in the method there can be no doubt, and in careful hands it is one agent we can use, as we can other drugs in suitably selected cases, but I believe like pituitrin, which has been used freely and with dangerous results, it should be mixed very thoroughly with brains.

I deplore very greatly the exploitation of this method that has taken place in the lay press. I think it is very unfortunate, in that it has placed the medical profession in a very disagreeable undignified and uncalled for position, and to my mind the propaganda that has been carried forward resembles too much that of the Friedman treatment.

DR. J. HENRY CARSTENS, Detroit, Michigan.—Having been originally an obstetrician, the question to my mind is simply this: What is obstetrics? What is a delivery? It is a physiological process. If it is a physiological process and the woman is normal, do we need to use forceps, or do we need to use scopolamin or any other drug? Is it, all things considered, the best thing to allow the physiological process to go on as nature intended it should? Does not the same thing apply to defecation? If defecation is a normal process, why do you need to short-circuit the bowel or resect the transverse colon? When you have an ordinary normal physiological process, and a normal physiological patient, a man or woman, my advice is to let nature alone. There is too much meddlesome interference in many of these cases. If you have an abnormal woman to deal with who has a rigid cervix that will not dilate, or one that dilates very slowly, in former times I used atropin with good results, the same that you would obtain with the use of scopolamin or any other drug. That agent will act on the circular muscular fibers.

And so in certain selected cases that treatment is good, but I do not think it is proper to let the statement go out among the general practitioners of the country that scopolamin-morphin anesthesia can be used indiscriminately. It should be pointed out that it is a dangerous method to use under all circumstances. In carefully selected cases those drugs can be used to great advantage. The methods, however, should be used in the hospital and under the supervision of experienced men.

DR. ARTHUR H. BILL, Cleveland, Ohio.—I was very much pleased with the safe and sound exposition of this subject given by the essayist, as well as by Dr. Schwarz. I think that the position taken by Dr. Schwarz is extremely scientific, conservative and fair-minded. As repulsive as the agitation for twilight sleep has been to me, and I presume to all of us, the ultimate result may be good. It has stimulated activity along a line that has been too much neglected. Personally, I have no sympathy with the view that childbirth is such a physiological process that we should sit by and allow nature to take her course regardless of the condition or suffering of the patient. It is our duty to relieve the suffering of the patient as much as possible. I have made it a practice in my work to do everything I could to relieve the pains of childbirth. My position is this: I give a patient something to relieve pain practically the minute she wants it, no matter what the stage of labor is, but what is given depends upon a great many different conditions. A general anesthetic may be given, and this may be ether or nitrous oxide. In other cases, earlier in labor scopolamin and morphin may be given. At any rate, something is given to relieve the suffering of the patient when she wants it; and with the further development of the technic of anesthesia during labor it should be possible to greatly relieve the sufferings of childbirth.

As far as the use of scopolamin-morphin is concerned, I cannot give you an accurate statement as to the number of cases in which I have used it, but the number is over 200. My position may be summed up somewhat as follows: I believe that scopolamin and morphin, one or both, are contraindicated in the second stage of labor. I never give them in the second stage, and I try not to give them in the latter part of the first stage. In other words, I would not like to give either within three hours of the birth of the child.

Dr. Rongy reports a certain fetal mortality, 1.8 per cent. in cases not accounted for by other complications, which could be causes of the death of the child. It occurs to me that these deaths may have been due to too prolonged use of these drugs, that is, too many repetitions of them, so that they are continued even in the second stage. In most multiparæ a general anesthetic is sufficient. My experience is that comparatively few multiparæ need more than a general anesthetic because labor is comparatively short, and from the time the pains are severe enough to make the patient desire to be relieved of them, it is possible to start and continue the use of a general anesthetic throughout the rest of the labor. In a good many primiparæ the period of suffering of the patient is considerably

longer than we wish to cover by the use of a general anesthetic. In these cases we do not like to sit by and do nothing for the relief of the patient. In many of the patients I am sure it is possible to use scopolamin and morphin with considerable benefit to the patient. I have used it as a preliminary to the general anesthetic which is continued throughout the rest of the labor. In the cases in which I have used it in this way, stopping before the time when it is usually stopped, and continuing a general anesthetic, I have not had bad results. I have never had bad results from the standpoint of the mother, even when the injections have been given in the second stage, but it has been necessary to resuscitate some of the babies.

There are certain disagreeable factors connected with scopolamin-morphin anesthesia, for example, certain patients are delirious and almost unmanageable, but if we try to relieve patients by anesthetics, we are bound to meet with some difficulties, which, however, may be overcome.

There is one thing that has not been mentioned, and that is, the use of these drugs in cases of premature birth. If we are handling a case of premature birth, we ought not to use scopolamin-morphin anesthesia for the effect upon the respiratory center is more marked and the babies cannot be resuscitated in some cases.

As far as the use of forceps is concerned, objection has been made to the fact that forceps delivery was necessary in 26 to 28 per cent. of the cases. Personally I do not believe that this is a serious objection to the use of anesthetics during labor. If forceps are skillfully used, low forceps particularly, that is, simply lifting the head over the perineum, as mentioned by Dr. Rongy, there can be no objection on the ground that either the mother or babe are exposed to extra danger. Personally, I do not hesitate to terminate that part of labor, the difficult part of labor, when the head is being pushed over the perineum. It is not always done to save the life of the child; it may be in the interest of the mother as well. I cannot say from my own experience that any complications or any worse results follow from the use of low forceps than when the patient delivers the child.

DR. HENRY S. LOTT, Winston, North Carolina.—For twenty years I did my share of obstetric practice. I love this branch of the work, and I watch my patients closely. The general practitioner is looking for authoritative reports, and my feeling toward this feature of our work is this: The general practitioner, who without careful consideration and weighing all sides of the subject, goes into a home loaded with pituitrin, and twilight sleep, is a dangerous man. He is far more dangerous in that home than would be a Zeppelin bomb.

DR. E. GUSTAVE ZINKE, Cincinnati, Ohio.—I began the practice of obstetrics when men still talked loudly and long against the giving of an anesthetic in any kind of labor. I have heard men express holy horror forthose who were guilty of this practice and of exposing women for the purpose of introducing a catheter. But that time has passed. It is our duty to relieve human suffering, but it must

be done with good judgment and care. I am a firm believer in relieving labor pains, if necessary. We should never meddle with labor cases. The woman who bears-up well when giving birth to a child and who continues to progress favorably, will require little or no help. There is no reason for giving an anesthetic under such circumstances. Let us be careful. Let us not contribute in the least to making cowards of our women. (Applause.) We are born and put into this world for a distinct purpose. We must teach the young that it is to the honor of both men and women to do their duty at all times and under all conditions. And withal we should assist each other and relieve suffering.

My experience with the practice of obstetrics extends over forty years. The last few years I have seen labor cases only in consultation. In most of the cases that have come into my care I got along beautifully with the occasional administration of a hypodermic of morphin, sometimes I used chloral hydrate alone, now and then combined with the former. In most cases chloroform was given just enough to obtund the pain near the end of the second stage of labor. In rare instances, when necessary, all these drugs were used and chloroform, or ether, given to complete unconsciousness. Like many of us, I have had numerous cases where women, who had been previously attended by a midwife, or a physician, claimed never to have had such good care and such an "easy time" as I had given them, and that they did not want anybody else but me thereafter. There is, perhaps not one among us who has not had the same experience.

When the article on "Twilight Sleep" or "Painless Labor" appeared in one of our popular monthlies, there were many in the medical profession of this country who felt that a serious wrong had been committed. Now, I am distinctly pro-German, and would not, at this time, abuse a German, or anything German, under any circumstances even if justified. (Laughter.) But, as we are talking *inter nous*, I am free to state that the originators of twilight sleep covered themselves with no glory by publishing their experience with scopolamin-morphin in the manner they did. It was this that gave offense not only in these United States, but anywhere where that particular publication was read. It was nothing but prostituting the art and science of midwifery to mercenary purposes. It was a bid for pregnant American women to go to Freiburg to be delivered "*painlessly*," and to have "*healthier and handsomer babies*" on account of it.

The fact remains: All women continue to suffer, more or less, under the "twilight" treatment; but, as in all other instances, the suffering is soon forgotten. I want to be reasonable. I think Dr. Schwarz and Dr. Rongy presented the subject very clearly. Let the remedy be tested thoroughly to see whether there is anything in it worthy to be kept. If the method proves to be better than the simple use of chloroform or ether, with or without chloral or morphin, let the method be adopted. But do not lead women to believe they can be delivered without the least pain. No obstetrician, who is an

obstetrician, believes that this can be done without complete anesthesia.

DR. RONGY (closing).—I wish in the first place to thank the members of the association for their very interesting and instructive discussion of my paper.

With reference to oligopnea, the point raised by Dr. Schwarz, I believe that the asphyxia is not induced by morphin but by scopolamin. In our cases morphin or narcophin was used only once as an initial injection and was but seldom repeated, yet the percentage of oligopneic babies born was as high as 17 per cent. The period of time between the first injection and the delivery was in most instances sufficiently long to exclude any possible effects of morphin. The dilated pupils observed in these babies further emphasizes the fact that they are under the influence of scopolamin rather than morphin.

As to the increased use of forceps, mentioned by Dr. Tate; this is due entirely to the fact that the second stage of labor is very often unduly prolonged. The head reaches the perineum and the expulsive power is not sufficiently strong to bring about the birth of the child. In the majority of cases the forceps is used for the purpose of lifting the head over the perineum.

As to the infant mortality, mentioned by Dr. Pfaff, I wish to state that in this series of 2000 cases the infant mortality is somewhat higher, when we take into consideration that this treatment was administered to patients at or about term with the viability of the child thoroughly investigated. These patients in most instances were attended by competent obstetricians. Notwithstanding all this we find an infant mortality of 3 per cent. which I think is higher than it should be. There are eighteen stillbirths reported, that are not accounted for pathologically but we know of three or four cases in which morphin was repeated three times and the dose of scopolamin given was entirely too large. I believe the danger of the babies may be greatly lessened if we strictly adhere to the technic outlined by Gauss.

As for restlessness which was observed in a number of cases I feel that this condition will always obtain in a small per cent. of cases. The highly emotional type of woman who cannot bear pain, and who in a measure is subject to suggestion will necessarily be influenced by scopolamin-morphin anesthesia much more readily than the woman who is less sensitive and more stoically constructed. There is certainly a class of women who must be relieved of some pain during labor.

It seems to me, that the sooner we are able to explain that the so-called "Twilight Sleep" is not a painless labor but that it is a method by which a certain amount of pain may be reduced, the better it will be for the women and it will also help to bring forth the true merit of this method of treatment so that it may be properly placed as an addition to our obstetric armamentarium. I am convinced from personal experience and from the various reports received that scopolamin-morphin anesthesia will not and cannot be universally

adopted, yet it will be used in certain numbers of selected cases by properly trained men and with proper hospital surroundings.

To generally advocate this treatment would prove disastrous to both mother and child.

ATYPICAL CHORIOEPITHELIOMA.

BY

BEN R. MCCLELLAN, M. D., F. A. C. S.,

Xenia, Ohio.

SÄNGER in 1888 was probably the first to recognize and to call attention to a tumor which was related to pregnancy and which differed essentially from any other known tumor.

Adami says that in the years immediately following the publication of Sängers description of this tumor there was an angry discussion among leading pathologists as to the origin of the same. Some contended that they were decidual and, therefore, of maternal origin; while others claimed they were chorionic and, therefore, of fetal, epiblastic origin.

It probably was Marchand's investigations and deductions that helped most in establishing the fact that these tumors originated in the chorionic epithelium and are best classified as (1) typical, (2) atypical and (3) transitional chorioepitheliomata.

(1) The typical chorioepitheliomata are composed of varying proportions of large multinucleated, eosinophil, syncytial masses and a smaller proportion of mononuclear, polyhedral, lightly stainable Langhans' cells. No great importance is attached to the presence or absence of villi, or to the varying degrees of metaplasia of these cells.

(2) The atypical chorioepitheliomata are described as an infiltration of the uterine musculature with large acidophil, mononuclear cells which Marchand and others have shown to be derived from the fetal ectodermal cells. The function of these cells, their resemblance to the syncytium, as well as their association with more definite syncytial masses in the infiltrated muscle, led to their designation as syncytial wandering cells.

(3) Marchand also described transitional tumors in which there is an increasing proportion of the syncytium and wandering cells and a decrease, or absence, of Langhans' cells as compared with the typical tumors.

Ewing, after most painstaking research, has amplified this classification by subdividing the typical into (a) chorioadenoma destruens (the so-called malignant placental polyp) and (b) chorio-

carcinoma. In this group the tumor cell exhibits a remarkable capacity for growth apart from villi, showing also advanced metaplasia, and in metastasizing it shows a remarkable loss of differentiation, grows diffusely and fails to show the orderly arrangement or polarity of the milder forms.

Ewing also suggests a twofold division of the atypical group into (a) the least malignant class to be called syncytical endometritis, and into (b) a transitional class to be called syncytioma or syncytial chorioma. It is in the atypical group that we find so many cases which recover either spontaneously or after partial removal of the tumor.

Ewing claims in favor of syncytioma or syncytial chorioma, that it is easy in them to account for the varying degrees of progression and regression. His argument is exceedingly interesting and is based on the fact that there is a definite relationship between the histological structure and the clinical history of these tumors, and that in this way only can a definite potential malignancy for each group be established. Therefore, both prognosis and treatment depend in large measure upon the accuracy of our knowledge of these facts.

The case herewith reported is classified as an atypical chorio-epithelioma. Mrs. F., a patient of Dr. O. (to whom I am indebted for the case report up to the time of her admission to the hospital) aet. twenty-five; multipara; three children; ages two, five and seven respectively; family history good. Prior to 1912, general health was excellent. At this time she miscarried at the seventh month. Ill health followed. The principal complaint was general weakness and an unaccountable, persistently recurring, anemia. The latter was so pronounced that menstruation was very scant and the menstrium very pale. February, 1914, menstruation ceased. June 13, miscarried at three months. The attending physician thought that the uterus had completely emptied itself. June 14, a severe chill followed by high fever and profuse perspiration. July 5, the lochia became both profuse and offensive, whereupon Dr. O. did a careful curettement. The scrapings were not examined microscopically. All symptoms improved for a few days, only to recur with greater violence.

July 19, patient was admitted to the hospital and placed in the writer's care. She was *extremely* weak; had an anxious expression; waxy pallor of the face and skin; filiform pulse; well-marked air-hunger; hemoglobin less than 40 per cent. The persistent uterine hemorrhage was extremely pale in color and offensive in odor. Uterus large; cervix patulous, revealing a soft spongy mass in cavity of uterus. This spongy mass, after removal, had the gross appearance of an old blood clot undergoing putrefaction. However, when this was carefully examined under the microscope there were very many large mononuclear cells found, which the pathologist, Dr. R. H. Grube, pronounced

typical, wandering, syncytial cells. The uterus was carefully packed with iodoform gauze and hemotonics prescribed. The patient's condition improved slowly until August 1, when she was seized with sharp pain in left thorax external to the base of the heart. This was accompanied by hard paroxysms of coughing to be soon followed by free, bloody, offensive expectoration. Specimens of the sputum were repeatedly examined by Dr. Grube, and always found to contain large mononuclear cells identical with the ones found in the bloody mass removed from the uterus. At this time the liver and spleen were found to be greatly enlarged and thereupon an unfavorable prognosis was given. But, all expectations to the contrary, there was an immediate improvement in the patient's condition. The septic condition disappeared and general health greatly improved. Hemoglobin soon reached 80. September 20, 1914, the patient was discharged from the hospital. At this writing her health seems completely restored. A physical examination made September 8, 1915, shows absolutely no sign of disease in the pelvis or in the lungs.

In addition to the case detailed above, as an example of atypical chorioepithelioma, and, probably, belonging to the subdivision described by Ewing as syncytial endometritis. I am quite sure, that at least two similar cases have come under my observation in past years of which I have no clear record, except the simple statement of the pathologist, at the time of the operation, that the specimens were pure types of chorioepithelioma; and, the further interesting fact, that both of these cases followed pregnancies occurring during a period of ill health in which anemia was a prominent symptom.

I cannot but conclude that the lowered vitality and impoverished blood constituents were contributing factors in the etiology of these tumors. And, furthermore, I am convinced that this disease is far more common than is at present recognized. This is, no doubt, largely due to the fact that most operators, like myself, have been too indifferent as to the value of laboratory examination of specimens obtained at the time of operation. In substantiation of the former statement as to the etiology of this disease, I ask your indulgence to a few pithy quotations from one of our most careful observers, touching upon this and other points connected with this brief report:

Dr. George Schmauck, in a most interesting paper read before the Chicago Gynecological Society, February, 1906, says: "I regard this peculiar growth as a consequence of pregnancy and attribute the proliferative tendency of its cells to a deficiency of the resistance of the maternal organism and not the emancipation of the chorionic epithelium." "Spontaneous recovery from incompletely operated cases can only be explained by the assumption of maternal protective

powers." "Contrary to the still very speculative spontaneous recovery in carcinoma, one may frankly state that it is the woman's nature, not the surgeon's knife, which cures chorioepithelioma." "Operative intervention does not cure the woman of the growth, the constituents of which have probably permeated the whole parametrium and have settled in other organs. We only relieve her from the weakening hemorrhage and discharge, and facilitate thereby her spontaneous recovery." "The most significant point in the clinical diagnosis is the discrimination between a localized process and a generalized chorioepithelioma. The localized growth developed within the placental area is relatively harmless. It remains local because (and as long as) the maternal organism masters the dissemination."

Again, Schmauck calls attention to the fact that "Schmorl's research has proven that embolism of placental cells occurs at all periods of pregnancy, and that these deported cells may even proliferate in the invaded pulmonary vessels." Therefore, "pulmonary symptoms should not be valued too highly. In a disease which chiefly takes place inside of blood-vessels an occasional pulmonary infarct cannot astonish us." Again he says: "Chorioepithelial elements, so far as I know, have never been detected in the sputum." The pathologist in the case herewith reported is very positive to have found them.

Stahl, in discussing Schmauck's paper says: "It may be these chorioepithelioma are benignant up to a certain point, but when proliferation takes place beyond a certain point then they with their metastases become malignant."

Concluding, Schmauck remarks, "With our present knowledge of chorioepithelioma malignum we shall decide comparatively early to remove the uterus in an older woman when there is an actually destructive growth. But in a young woman only after a serious consideration of all other circumstances."

In presenting this brief paper the writer has hoped to emphasize the necessity of more careful examination of all specimens removed by the curet, and of a more careful preservation of records in all such cases. Second, to express the belief that atypical chorioepithelioma is far more common than is at present recognized. Third, to call attention to the possible influence of impoverished blood conditions as a determining factor in the etiology of this peculiar disease. And finally, to express the hope that prompt medical and surgical intervention, having in mind the conservation of the patient's own curative resources, will be the guiding principle in its treatment.

FIBROID TUMOR COMPLETELY OBSTRUCTING UTERINE CANAL; DEAD FETUS LONG RETAINED WITHOUT INFECTION.

BY

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(With one illustration.)

IN connection with the report of a very unusual case of uterine fibroid complicating pregnancy, I wish to call attention to a series of collated cases which present numerous interesting features of a somewhat similar character.

The first is a demonstration by Hartog(1) of a submucous cervical myoma the size of a child's head, weighing 1250 grams, which was enucleated during the placental period. The patient was a woman, thirty-eight years of age, pregnant with her fifth child, who was admitted to the clinic after three days of ineffectual labor pains. Immediate extraction of a dead child per vaginam was performed. Extremely profuse hemorrhage ensued and manual detachment of the supposedly adherent placenta was to have been performed for control of the bleeding, but on introduction of the hand the passage to the uterine cavity was found to be blocked by a tumor as large as a child's head, which was broadly inserted at the upper cervical segment on the right side. It was interpreted as a submucous myoma. The placenta was reached with difficulty, alongside of the tumor, and was extracted as a whole. Although the uterus contracted satisfactorily, the hemorrhage continued and became alarming. It was, therefore, decided to extirpate the myoma and the enucleation was successfully accomplished. As the hemorrhage stopped, no further operation was performed; especially as no perforation could be discovered on careful examination. Patient was given camphor and an infusion of 1000 c.c. salt solution, and her general condition visibly improved. After about one hour the hemorrhage reappeared and could not be controlled by massage. Patient's general condition became rapidly worse and the pulse was temporarily imperceptible. Soon after the uterus had been tamponed as an emergency procedure, the patient died, two hours after delivery.

Rosenstein, in the Breslau Gyn. Society, referred to a case under his observation in which a large cervical myoma was mistaken for an ovarian tumor. Rosenstein performed laparotomy and induced

artificial labor by means of a bougie. The resulting pains had the effect of wedging the myoma into the small pelvis, thereby causing total intestinal obstruction. Seemingly no alternative was left but the vaginal removal of the pregnant uterus together with the tumor. This was successfully accomplished and the patient made a good recovery.

Zangemeister(2) presented a myoma of the parturient uterus obtained by operation. The myoma had attained the size of a large fist and blocked the pelvis of the patient, a primipara thirty years of age. A living child was obtained through Cesarean section. At the operation the uterus appeared to be in imminent danger of rupture and supravaginal amputation was performed, followed by detachment of the myoma. The uterine cavity contained gaseous, purulent, amniotic fluid, colon bacilli and streptococci. An uneventful recovery ensued.

Fuchs(3) performed a Porro operation upon a primipara forty years of age, on account of a myoma acting as an obstacle to delivery. Mother and child were discharged well on the fourteenth day after the operation.

This case of Fuch's presented certain noteworthy features, aside from the rapid growth of the myoma, which *during six months of the pregnancy reached about three times its original volume*. The topographical relations of the tumor to the pregnant uterus (the anterior uterine wall being the seat of the tumor) led to an extreme bulging of the posterior uterine wall, still demonstrable in the fifth month. The rising uterus did not drag the myoma along, as had been expected, but by virtue of its subperitoneal location the myoma continued to develop downward into the pelvis where it finally became an irreducible birth obstacle. Spontaneous expulsion with the labor pains failed to occur. The fetus came to lie in a transverse position in consequence of the obstruction at the pelvic inlet. Cesarean section seemed positively indicated. The conservative Cesarean section alone, leaving the tumor behind, would have exposed the myoma to the danger of necrosis during the puerperium, especially as it extended near the lower birth passage. At any rate, the patient would have had to submit to another laparotomy later. Cesarean section with enucleation of the myoma would have created less favorable conditions of the wound than the procedure which was selected, namely, supravaginal amputation which fulfilled both the obstetrical and the gynecological indications and resulted in recovery.

An interesting report was made by Carmichael(4) of the case of a primipara forty-two years of age; a myoma the size of an apple was removed from the uterine fundus, through a laparotomy incision, in

the fifth month of pregnancy, on account of severe pains. A larger myoma was found to be in the cervix, presumably an insuperable obstacle to spontaneous delivery. This was not disturbed and the pregnancy progressed without interruption, and at term the patient was delivered of living twins, through Cesarean section followed by hysterectomy.

Volmat(5) refers to the case of a primipara, forty-three years of age, who was found to have a large myoma the size of a child's head,



FIG. 1.

solidly wedged in the pelvic inlet; the child lay above it in transverse position. The pregnancy took an uninterrupted course. At the end of the ninth month, in the absence of labor pains, Cesarean section was performed, followed by hysterectomy. Mother and child made good recoveries.

Fothergill(6) describes a case in which the fibroma was applied to the anterior wall of the uterus, very low down, absolutely blocking the pelvic inlet. Mother and child were both saved through Cesarean section.

G. A. Hendon(7) enucleated a fibroid tumor by laparotomy and discovered a four months' pregnancy; the woman aborted in twenty-four hours, but made a good recovery.

Schrenck(8) observed the combination of two subserous myomata, the size of a fist, with normal pregnancy. Delivery at term with forceps. Atonic secondary hemorrhage followed, but good recovery resulted.

The interesting case which I will briefly report is as follows: A colored woman, thirty-five years old, was admitted to the Indianapolis City Hospital, Oct. 7, 1914. Unfortunately a very meager history was obtained and the patient could not be located after leaving the hospital. She was a multipara and had usually enjoyed fair health; there was no history of an acute infection, nor of any inflammatory attacks. She had complained only moderately of pelvic soreness and backache. Examination before operation showed a uterine tumor of good size which presented two large bosses. *Clinical diagnosis*—fibroid tumors of the uterus. Operation, Oct. 13, 1914. Dr. O. G. Pfaff; supravaginal hysterectomy; left tube and ovary not removed.

Gross Description of the Specimen.—The specimen consists of the fundus of the uterus together with the right tube and ovary. It measures about 7 inches in length and presents two tumors. The lower is about 5 inches in diameter, is very elastic and firm. The upper, which is situated somewhat in front of the lower, is about 2 inches in diameter and gives a sensation when palpated like that of parchment. It appeared to be a calcareous structure. On medial longitudinal section, the lower tumor is found to be a large submucous fibroid measuring on an average of 4 inches in diameter and bulging into the cavity of the uterus which is distorted to accommodate it. The small crepitant tumor above is found to be the skull of a partially macerated fetus which is still attached by the umbilical cord to the remnants of its placenta. The skull measures 2 inches in diameter and is covered by a thin coat of uterine muscle. The brain has been reduced to a grumous material resembling thin cottage cheese. No amniotic fluid is present. The ovary and tube are normal. *Diagnosis*—submucous fibroid tumor blocking the outlet of the uterus; macerated fetus. *Microscopic sections* of the tumor were made which show nothing of special interest.

The pregnancy had evidently been interrupted many months previously and indeed the appearance of the fetus suggested that it might have been present in its peculiarly isolated and protected position for a term of years, infection having been obviated by the mechanical occlusion of the greater part of the uterine canal. Uneventful recovery ensued.

My chief thought on this subject is that mechanical obstruction of the birth canal, due to the presence of fibroid tumors, is sufficiently common to merit that degree of appreciation at the hands of the

family doctor which shall lead to a more intelligent activity in efforts to prevent the serious and sometimes disastrous complications which result in such cases when pregnancy occurs. We all concede a general familiarity with the subject but to consider the matter in a purely speculative way is hardly sufficient. The study of specific cases should be of much greater value, and may in turn enable us to present to the medical attendant in a more convincing form the reasons why, even the smaller fibroids, should be sought and removed. One may easily lose sight of the fact that a small tumor frequently undergoes a considerable and sometimes very great enlargement during pregnancy, and that to ignore the presence of these neoplasms is to determine that the individual must in the event of pregnancy assume a grave and unfair hazard and one which she might be readily spared through a timely surgical operation.

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- NEWTON CLAYPOLE BUILDING.

THE COMBINED OPERATION FOR THE INTERRUPTION OF PREGNANCY AND STERILIZATION.

BY

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Omaha, Neb.

THE interruption of pregnancy at whatever stage and by whatever means is at best a grave procedure. The gravity of the operation does not rest alone in the determination of the indication but as well in the manner of execution. None of the recognized procedures are without danger and experience has taught us that there is an element of uncertainty in all operations.

Where it becomes imperative to interrupt pregnancy for physical conditions which are to remain a lasting obstacle to future child-bearing, the method by which this may be done with the minimum of risk is that first proposed by Sellheim.(1) The procedure consists

of a combination of abdominal hysterotomy and resection of the Fallopian tubes.

The author has performed this combined operation on four occasions and is convinced that the dangers attending the interruption of pregnancy are minimized by removing the ovum through a fundal incision. There is little risk of infection and the dangers of perforation of the uterus and of overlooking placental remains are wholly eliminated. Furthermore, there is a minimum of blood lost and of time consumed in the operation.

Anderes(2) says that in a series of cases in which pregnancy was interrupted and the proposed sterilization was postponed for a future time, it often happened that a second pregnancy intervened before the return of the patient, thus necessitating a second interruption of pregnancy with its attending dangers.

The following technic is employed by the author: 1. Hypodermic injection of pituitrin (1 c.c.) given five minutes before operating. 2. Median abdominal incision. 3. Transverse fundal incision, the incision extending from tube to tube. 4. Enucleation of the ovum with the fingers and inspection of the entire uterine cavity. 5. Closure of the uterine incision by a double row of catgut sutures. 6. Double ligatures passed about either tube with resection of one-half inch of the tube between ligatures and enveloping the severed ends of the tubes between the layers of the broad ligaments. In removing the ovum, the fingers may be reinforced by the placental forceps or a swab of gauze, thereby insuring the complete emptying of the uterus under direct inspection and with the minimum of injury to the uterus.

In the four cases in which the above technic was used, the following indications were presented:

CASE I.—Primipara, aged twenty-three, pregnant eight weeks, presented a combination of active tuberculosis of the lungs and latent tuberculosis of the left hip-joint with ankylosis and marked abduction of the thigh. So great was the abduction of the thigh that it was impossible to dilate the cervix with instruments and the author was forced to do an abdominal hysterotomy for the interruption of pregnancy. Following the emptying of the uterus through a fundal incision, the tubes were resected.

CASE II.—Mrs. L., forty-two years of age, had eleven living children, the youngest one year of age. She was poorly nourished, was suffering from an exophthalmic goiter and a mitral lesion with evidences of incompetency and was in the fourth month of gestation at the time of operation. The combined operation of interruption of pregnancy and sterilization was performed with little or no depression.

CASE III.—Mrs. B., aged forty-three, mother of three children, weighed 228 pounds three years ago, but had lost 100 pounds since that time. She was four months pregnant, had been unable to take nourishment for the past month, and as a consequence was extremely depressed. The posterior surface of the uterus was adherent to the rectum and both ovaries were firmly embedded in adhesions. In the operation the adhesions were severed, one ovary and tube removed, the opposite tube resected, and the ovum removed through a transverse fundal incision.

CASE IV.—Mrs. L., aged thirty-four, para-iv, now in the fourth month of gestation. Patient had lost some 40 pounds in weight in the past six months, was suffering from persistent vertigo, disturbed vision, constant headaches, rapid heart beat, low grade of temperature and increasing weakness. She was kept in the hospital under observation for three weeks. No focal infection could be found, but it was evident that she was suffering from some sort of toxemia. Her condition became increasingly grave. In view of the facts that she was thirty-four years of age, had four living children and that the symptoms antedated her pregnancy by two months, it was determined to execute the combined operation of hysterotomy and resection of the tubes. The convalescence was slow but complete, with the exception of disturbed vision which has not as yet wholly disappeared.

The convalescence of these four cases was more satisfactory than could have been expected from any other method that might have been employed to meet the double indication of interruption of pregnancy and sterilization.

These cases will serve as types of a limited class of cases which call, not alone for the interruption of an existing pregnancy, but for the guarantee that there will be no future pregnancies. It is needless to add that the indication for such a radical procedure must be a permanent disability, wholly incompatible with pregnancy; *i.e.*, incompetent heart lesions, aggravated forms of exophthalmic goiter, active tuberculosis, grave psychoses and chronic nephritis. The procedure is naturally more adaptable to women who have given birth to one or more children.

Fromme and Jaschike argued in favor of the operation in the Fourteenth German Gynecological Congress at Halle, and we find it an established practice in the clinic of Zurich.

Dutzmann reported satisfactory results at the Fourteenth German Gynecological Congress, 1911, in a similar procedure performed per vaginam. A longitudinal incision was made through the anterior vaginal wall, the bladder reflected from the uterus and the vesico-uterine fold opened. The uterus was then drawn forward and opened by a longitudinal median incision, the ovum extracted by means of

the fingers and the decidua curetted. A strip of sterile gauze was passed into the cavity of the uterus and out through the cervix into the vagina. The uterine incision was then sutured, the tubes resected, and the fundus fixed to the anterior vaginal wall. As remarked by Hofmann⁽³⁾ the vaginal operation of Dutzmann is not applicable to pregnancies beyond the fourth month and is not so free from the dangers of sepsis as is the abdominal operation.

Hofmann reported twenty cases with the following indications: Pulmonary tuberculosis, eleven cases; cardiac lesions with failure of compensation, three cases; chronic nephritis, three cases; renal calculus with anuria, one case; psychosis, two cases.

CONCLUSIONS.

1. The combination of abdominal hysterotomy and resection of the Fallopian tubes is the procedure of choice in all cases not previously infected.

2. The removal of the ovum through an abdominal incision should be reserved for those cases in which permanent sterilization is desired.

3. No other method is so free from the dangers of sepsis, retained secundines, perforation of the uterus and excessive loss of blood.

4. In point of safety, expediency and efficiency the procedure will appeal to all abdominal surgeons.

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3602 LINCOLN BOULEVARD.

DISCUSSION.

DR. SAMUEL W. BANDLER, New York City.—I am very glad that Dr. Findley has called our attention to the indications for interfering with the progress of pregnancy. A rule which I have adopted for myself these many years is as follows: If any patient, who for any genuine reason ought to have no more children, is pregnant, and if her physician in conjunction with me or I in conjunction with another physician feel that she ought not to have any more children, including the one she is going to have, I remove that embryo from the uterus, provided, and only provided, she allows me to sterilize her. So I have followed that procedure in several instances, not however removing the embryo from the uterus by abdominal hysterotomy, but in the usual way and then preventing the subsequent occurrence of pregnancy by an operation on the tubes. In a very early case,

where the patient is pregnant eight or ten weeks, one may safely curet and through a T-incision through the vagina separate the bladder, bring the uterus out and take care of the tubes. When, however, the patient is pregnant three or four months, I curet and do an abdominal operation. There is one little difference in my technic, possibly, and that is, instead of doing as I formerly did, tying two ligatures, resecting between the two, pushing the uterine end in a double fold of peritoneum, I make an incision at the uterine horn and simply close the peritoneum over it. That is a simple method and I feel rather more secure. That method is the one I follow in ligating or resecting tubes in the vaginal operation, the Duhrssen vaginal operation for a total prolapse, where no further pregnancies should be permitted.

DR. FINDLEY (closing the discussion).—I would recommend that Dr. Bandler try the interruption of pregnancy through a fundal incision when he has an opportunity to do so. Most of us, as our experience grows, become less and less cock sure that we can remove all placental tissue by means of the placental forceps, and we are always fearful lest we puncture the uterus, however careful we may be. I do not consume more than twenty minutes in doing the combined operation.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of October 12, 1915.

The President, DR. DOUGAL BISSELL, in the Chair.

DR. LEROY BROUN presented a report of a case of

EARLY PREGNANCY COMPLICATED BY BILATERAL OVARIAN DERMIDS.

In this case the patient, aged thirty, had been married for two and one-half months. When seen on the evening of July 9, 1915, she gave the following history: she had not been aware of any pelvic disturbance either before or after marriage until two days previously. She was married after the April period and nothing was seen during May and June. She believed she was pregnant, but having no symptoms had not consulted her physician. On July 8, she began to have pain in the right lower portion of the abdomen, which increased in severity on the next day. She was examined by a physician who referred her to Dr. Broun. At this time the patient showed signs of shock with a slight rise of temperature, the abdomen was distended and very painful to the touch in the right lower quadrant. A bimanual examination seemed to point to a cyst posterior to the uterus which filled up the culdesac and a tumor could also be felt projecting above the pubis. The uterus could not be definitely palpated. The patient was removed to the Woman's Hospital and

on opening the abdomen a few hours later a tense ovarian cyst with markedly congested walls and a twisted pedicle was found, together with a second one posterior to the uterus. No functioning ovarian tissue could be found and both of the tumors and the tubes were removed together with the appendix. The patient made an uneventful recovery and at the time of the report was about five months pregnant.

The pathological report described two multilocular cysts containing a large amount of sebaceous matter in different chambers, also long dark hairs. In the cyst walls several varieties of tissue were found including cartilage and bone. Histological examination showed all the different elements found in normal skin, including sebaceous glands, unpigmented hairs and a very horny epidermis. In another section pieces of cartilage and brain substance were found.

DR. BROWN also reported a case of

HYSTEROTOMY FOR LARGE SUBMUCOUS FIBROID.

This patient was seen September 21 and gave the following history: aged thirty-seven, married eight years, one child four years previously. The patient stated that her menstruation was profuse up to April 1, and the May, June and July periods scanty. Nothing was seen in August, but in September there was a slight show. Her physician thought at first that she was pregnant but found that the uterus did not increase regularly in size and changed his diagnosis to that of a fibroid tumor. Examination showed an abdominal mass extending more than half way up to the umbilicus. Previous to opening the abdomen the uterine cavity was sterilized with tincture of iodine. Abdominal section disclosed a tumor which had every appearance of a pregnant uterus but manipulation gave the impression of fibromyoma developed in the anterior wall. On removing the same it was found that the growth extended into the uterine cavity so that a large wedge of uterine substance was removed, after which the uterine wall was approximated with three layers of sutures. The recovery of the patient was uneventful and the interest in the case was in the absence of menstruation during the months prior to operation and the suggestion of a possible pregnancy.

The pathological report showed no abnormalities in the curettings and the tumor was a myoma uteri.

DISCUSSION.

DR. BROOKS WELLS, in opening the discussion, said: "Dr. Brown's first case is interesting and of importance as illustrating an opinion which while quite widely held is not true, namely, that the removal of both ovaries during pregnancy always induces an abortion. I personally have seen two cases of pregnancy continuing after removal of both ovaries; one a great many years ago when I assisted Dr. Mundè to operate on a young woman who was about four months pregnant. The anteoperative diagnosis was ovarian cyst. The

patient was found to be pregnant about four months and had a dermoid cyst on either side, about the size of a large grape-fruit. The patient went to full term, was delivered of a normal child, and never menstruated afterward, so it is reasonably certain that no ovarian tissue was left."

"The second case was one that I operated on some years ago at the Polyclinic. She was the wife of a physician and about four months pregnant. Two ovarian cysts were removed. It was predicted that she would abort, but she did not, and went on to a normal labor."

DR. J. M. MABBOTT said: "Some years ago I saw a case in which from my first examination of an unmarried woman, who was a lady's maid, I thought I was dealing with a case of pregnancy and I am glad to say that instead of being angry this young woman said to me, 'Now, Dr. Mabbott, you are certainly wrong and I shall come back again in order to satisfy yourself that I am not pregnant.' She did so, and I found at the end of a month a growth, and I made up my mind it was a tumor of some kind, and shortly after that she had a severe attack in the night of terrific pain, with collapse. She was taken to New York Hospital, where a dermoid cyst with a twisted pedicle was removed.

"Perhaps that case isn't very applicable to this discussion, but it enables me to ask a question because the further history of the case was, that in one year, I think, she developed a rapidly growing tumor of some kind in the abdomen and for that she was admitted to the Presbyterian Hospital and there a melenosarcoma was found. It was a situation where nothing could be done and she died within three days after the operation, so that I would like to know whether Dr. Broun thinks that the previous dermoid cyst or the operation for its removal possibly was a predisposing cause for the semimalignant or malignant disease."

DR. J. O. POLAK, in discussion, said: "Was the first cyst examined for malignancy?"

DR. J. M. MABBOTT replied: "I regret to say that I probably never saw the pathological report on either cyst, but the first cyst was opened in my presence and had all the characteristics of a dermoid cyst, including the bony or dental material and a great deal of hair, and nobody suspected it as being anything but a simple dermoid."

DR. W. E. STUDDIFORD said: "I would like to report a case very similar to Dr. Broun's in which the cyst was likewise on the right side. The woman was admitted to Bellevue as a possible case of intestinal obstruction. There was severe vomiting. She was about four months pregnant with a distinctly palpable mass, not in the pelvis, but rather high up above the uterus. On opening the abdomen we found a thick-walled cyst, which was not a dermoid but a cyst of the right ovary with partial strangulation of the pedicle and, to our surprise, a cyst not quite as large on the left side. In that case both ovaries were removed. I don't think there is any question but that all of the ovaries were removed because both of them had very slender pedicles from the utero-ovarian ligament.

The patient went on to full term and was delivered of a live child and symptoms in this case were all those of an intestinal obstruction, severe vomiting with some distention of the abdomen with this rather freely movable body above the uterus."

DR. F. R. OASTLER said: "I had a case about six years ago which was very similar to Dr. Broun's, in a woman who had a cyst on the right side removed two years prior. When I saw her she gave all the symptoms of an ectopic gestation on the left side. I made a diagnosis of ectopic gestation (she had skipped two periods), operated on her in this belief and when I reached the mass on the left side I found that instead of a tubal pregnancy it was a unilocular cyst with a hemorrhage in it which was removed. She continued with her pregnancy, I delivered here of a living child and she has not menstruated since, at least not to my knowledge. I followed her for a year or two afterward, but lost track of her entirely after that."

DR. R. T. FRANK said: "I also have had at least one case in which an ovary was removed before the patient was pregnant and had to remove the other ovary during pregnancy, at about the fifth month, and she went to term. As far as any functional disturbances brought on by removing both ovaries during pregnancy after the very early weeks have passed are concerned, we have no reason, theoretical or practical, to suppose that such would result. There has been a case reported where pregnancy continued after the corpus luteum was removed in the third or fourth week of pregnancy (Essen-Moeller). Certainly after the sixth week of gestation removal of the corpus luteum, or of both ovaries, which is practically synonymous as far as function is concerned, ought to play no rôle whatever."

DR. BROOKS WELLS, in continuing the discussion, said: "Apropos of Dr. Mabbott's mistaking the diagnosis of pregnancy, it is usually a very easy thing to diagnose pregnancy, yet at times you have conditions present which may puzzle the most expert. In July a patient was sent to my office with a note from her physician, saying, "This is Mrs. B. She is pregnant about six months. Do you think it possible that I could be mistaken and that she is only pregnant five months?"

"She had not menstruated in six months, her breasts had grown larger, she had a moderate areola and there was fluid in the breasts. The cervix was soft. There was no blueness about the introitus, except a suspicion of a little blueness just under the urethra. The lower part of the abdomen was occupied by a mass exactly the size, shape and consistency of a pregnant uterus of four months. Under the circumstances one could not very well pass a sound and she refused an examination under anesthesia. I told her I was in serious doubt as to whether she was pregnant at all, that if she was pregnant the ovum was probably dead, and that it would be best for her to remain under the care of her physician until the matter could be definitely settled. She went to another and very expert man, a prominent member of this Society. He made a careful examination and told the patient that she had a normal pregnancy. I saw her again in September. At that time the breasts had become

soft and flabby, and the cervix hard. She was given an anesthetic and immediately it was possible, with the greatest ease, to dislodge an ovarian cyst which floated up into the abdomen and, of course, made the diagnosis perfectly clear. The surgeon, who had the case originally, operated and removed the cyst in my presence."

DR. LE ROY BROWN, in closing the discussion, said: "I would say to Dr. Mabbott that I cannot answer his question. I think it is not to be expected that a sarcoma would be associated with a dermoid cyst."

DR. GEO. L. BRODHEAD reported the following cases:

CESAREAN SECTION FOLLOWING PRIMARY SECTION WITH BILATERAL OOPHORECTOMY.

He said: "A little less than two years ago I reported to this society a case of Cesarean section followed by the removal of both large multilocular cystic ovaries. The patient made an uneventful recovery and was informed that while subsequent pregnancy was possible, there was only the remotest chance of conception. In March, 1914, there was a menstrual period, and on September 1, 1914, the patient declared she felt life. Pregnancy proceeded uneventfully and on January 28, 1915, a second Cesarean was performed at term, with sterilization of the patient at the earnest request of both the patient and her husband.

"The woman left the hospital with the baby at the end of three weeks, both in excellent condition. During the operation a corpus luteum of pregnancy was seen, but there was no other evidence of ovarian tissue.

"This case illustrates the great importance of conserving even a small amount of ovarian tissue (though no credit is assumed on our part, as it was thought that complete ovariectomy had been done), and also the futility of ligature of the tubes alone, in order to produce sterility."

CONCEALED ACCIDENTAL HEMORRHAGE.

"Mrs. J., para-ii, first came under my observation early in January, 1907. In her first labor, six months before, the child presented by the breech, but was born in good condition, and there was no history of bleeding during the pregnancy. The last menstruation had been in November, and from December 24 to January 26 there was more or less bleeding, sometimes moderately profuse, requiring a tampon. There was no further hemorrhage and the patient went to term, being delivered of a living 10 $\frac{1}{4}$ -pound child, presenting again by the breech. During her third pregnancy, the patient began to bleed at the end of two months and slight hemorrhage each day persisted for several weeks, then ceased. Abortion occurred at four and one-half months and recovery was uneventful. During the next pregnancy there was slight bleeding for a few hours, but the patient went to term. At seven and one-half months the presentation was breech, but external version was easily performed, the vertex presenting at the time of birth, and the child was extracted

by low-forceps operation. The patient's last child was born three days ago and the history is interesting. In April, 1915, when the patient was three months pregnant, there was slight bleeding for one day. At eight and one-half months breech presentation was found again, and I was unsuccessful in trying to perform external version. Labor began at 10 P. M., October 9, the breech presenting, the child of large size. At 3 A. M., October 10, the cervix was completely dilated and the membranes ruptured spontaneously. There had been no bleeding up to this time and the woman was easily delivered of a 9-pound child, moderately asphyxiated, but which soon cried lustily. Immediately after the birth of the head two large blood clots, weighing together about 2 pounds, were extruded.

"There had been a partial placental separation during the labor, and this probably caused the asphyxia, and may have accounted for the unusual amount of pain which the patient suffered during labor. Because of continued moderate bleeding, the placenta, which was found to be strongly adherent to the right horn of the uterus, was manually extracted, and the mother and child are now in good condition. The case is of interest because of breech presentation in all of her pregnancies, and especially for the large amount of concealed hemorrhage resulting from the partially separated placenta."

DR. ROBERT T. FRANK reported the following cases:

ACUTE YELLOW ATROPHY OF THE LIVER IN PREGNANCY WITH RECOVERY.

Acute yellow atrophy of the liver is a very rare disease, occurring once in from 16,000-10,000 cases of pregnancy. According to various authors (Freund, Edgar, De Lee), cases rarely recover. The following is the report of such a case:

F. W., twenty-seven years old, was seen in consultation because of intractable vomiting. The previous history was negative; married five years, one child four years old. Last menstruation thirteen weeks before. The patient had been in a New York hospital for eleven days and had left the same two days previously. The report obtained substantially said that the patient had toxemia of pregnancy, that the urine was practically negative, the temperature, respiration and pulse normal; that she had been given gastric lavage, calomel, restricted diet and nutritive enemata. Discharged at own request.

The gravity of her condition was quite apparent. I therefore sent her into Mt. Sinai Hospital (service of Dr. Brettauer, Surg. No. 156253, July 16-Aug. 27, 1915).

The nutrition of the patient appeared good, prostration moderate, considerable restlessness, icterus of conjunctivæ and skin; otherwise the general physical condition was normal. At the moment no vomiting. Vaginally a three-month uterus was felt. Temperature 101.4°. The urine showed a heavy trace of albumen, acetone and granular casts.

The uterus was at once emptied under gas and oxygen anesthesia.

For six days convalescence progressed favorably, the icterus clearing up, the temperature remaining normal. Then in the course of the one and one-half fingers below the free border, with blunt edge. next two days there was a febrile elevation to 103.8° F., twitchings, restlessness, recurrence of the vomiting. The lower border of the liver, which previously had not been palpable, now was plainly felt. The urine was cloudy and contained pus and *Bacillus coli communis*. The temperature hovered between 103° and 102° for nine more days, the general condition steadily improving, the jaundice lessening and the liver growing smaller until it appeared slightly smaller than normal. Complete recovery (except for a permanent chronic nephritis) followed.

Urine obtained on the day following admission and thereafter contained leucin and tyrosin for twenty-three days. The blood showed 29 milligrams of tyrosin to the 100 c.c.; the blood alkalinity was reduced, the uric acid and cholesterin percentage were normal. Wassermann reaction, Widal and blood culture were negative.

Leukocyte counts were approximately (13,000, polynuclears 64 per cent.; 8400, polynuclears 75 per cent.; 7600, polynuclears 75 per cent.; the hemoglobin 65 per cent.; the red blood cells 3,200,000.

Both clinically and by laboratory tests this case appears to have been a true acute yellow atrophy of the liver due to pregnancy toxemia, in which the process was terminated before irreparable damage to the liver had occurred. This case is an example of the great gravity of hyperemesis gravidarum and of the intimate relationship between this clinical entity, acute yellow atrophy and eclampsia.

VESICOVAGINAL FISTULA, COMBINED OPERATION, CURE.

This case is of interest from several points of view. First, because of the technical difficulties encountered; second because of the primary lack of success, and third, because the subsequent spontaneous cure especially illustrates the crucial requisite in the repair of these injuries.

Mrs. G. B., twenty-five years old, was sent to Dr. Frank because of loss of urine. She had been married eight years, had five pregnancies, with two children living and well. Four months before, she had been delivered, in a New York hospital, of a large child with transverse presentation. The delivery ended in stillbirth. From that time on all urine leaked through the vagina. She was twice anesthetized at the hospital and then told that the injury was incurable. She had repeatedly threatened to commit suicide.

The patient was sent into Mt. Sinai Hospital for operation (service of Dr. Brettauer, Surg. No. 156416, July 23 to Sept 21, 1915).

General physical showed a slightly built, thin woman, somewhat below the normal height. Her pelvis was normal. The vulva was inflamed, the vagina narrow. High up on the right pelvic wall, above the level of the cervix was a projecting red mass about $1\frac{1}{2}$ inches long which was the prolapsing bladder mucosa. The edges

were scarry, held close to the pelvic wall by rigid scar. By means of bed rest, salves and cleanliness, the local irritation was relieved.

On August 2, the patient was operated upon. The fistula was circumcised, the rest of the bladder being freed from the cervix. On attempting to liberate the lateral border of the fistula, profuse venous hemorrhage resulted, which could not be controlled. While pressure was made from below by an assistant, the abdomen was entered from above by a four-inch median incision below the umbilicus. The right round and infundibulopelvic ligaments were tied and cut, and the peritoneum between bladder and uterus incised. This exposed the depths of the right parametrium. By neither suture nor tampon could the bleeding be controlled; therefore, a strip of iodoform gauze was tightly sewn against the bleeding area, after the uterine artery was tied lateral to the ureter and this duct, which was distorted and adherent, had been mobilized for 2 inches. The gauze thus applied controlled the bleeding.

The fistula could not yet be reached. The uterus was completely removed with the right adnexa. The entire bladder was freed from the vagina down to the urethra, sharp dissection being required on the right side. The edges of the fistula could now be seen in the depths, but could not be drawn up far. As the patient's condition was growing poorer and hurry was imperative, the fistula was sutured from above (instead of from below). Three chromic Lembert sutures invaginated the mucosa. Over this was placed a running suture of chromic gut.

Besides the piece of gauze previously mentioned, two small gauze drains were led from the lateral angles of the parametria into the vagina. The peritoneal wound was closed as after a Wertheim hysterectomy and for further safety the sigmoid and bladder were sutured together forming a second layer. Vaginally a few silk sutures were hurriedly applied uniting anterior and posterior vaginal edges except where the drains passed through. A permanent catheter was inserted. The patient received an infusion of 10 ounces of saline intravenously. Convalescence was uneventful.

The entire urine leaked through the vagina from the time of operation on. On the fourth day after readjustment of the catheter more and more drainage through the tube was obtained. By the tenth day all drainage took place through the catheter. For an entire month large quantities of thick pus accumulated in the bladder in spite of irrigations. Before the patient was discharged, the urine became clear. A linear scar was seen in the bladder which, except for this and some adherence to the right pelvic wall, was normal.

The operation was correctly planned. On account of uncontrollable hemorrhage the vaginal portion of the operation had to be abandoned before liberation had been completed. The suture of the fistula per abdominem was hurried and incomplete. Nevertheless, because all tension had been removed, and the bladder fully mobilized, the tissue plains during healing glided upon one another and the false passage was obliterated. This and similar experiences show that elaborate layer suture of the bladder is unnecessary, that this

viscus, just as all other hollow viscera, shows a marked tendency to close abnormal openings, if tension is relieved or avoided.

DISCUSSION.

DR. O. P. HUMPHSTONE said: "I would like to ask a question which I think we all want to ask and that is, What anesthetic did the doctor use in his operation in the first case?"

DR. ROBERT T. FRANK replied: "I had it in my report, but I did not mention it. I used gas-oxygen anesthesia, which did not last more than about five minutes."

DR. C. R. HYDE said: "The doctor is very fortunate in having a case of acute yellow atrophy of the liver recover. I only saw one case, and that was a case of hydatidiform mole which I curetted and everything went along very well until about a week afterward, when the patient began to vomit. It was the most projectile and constant vomiting that I have ever seen. Coupled with this there was a marked icterus and then followed repeated rectal hemorrhages that never stopped. They came on about every ten to five minutes. A diagnosis was not made of acute yellow atrophy of the liver, but it was substantiated later on at autopsy.

"Now the term acute yellow atrophy of the liver perhaps means one thing when you read of it, but if you have ever seen a liver which has acute yellow atrophy you will understand why they say acute yellow atrophy, because if there is anything more saffron colored than real yellow atrophy of the liver I don't know of it."

DR. LEROY BROWN said: "I want to ask Dr. Frank in reference to the operation for vesicovaginal fistula, in which he was forced to take such radical measures to stop the bleeding, if it was his primary desire to separate the vagina from the bladder, in order to close the bladder opening. (Dr. Frank said: 'Yes, off to one side.') In hearing his description it occurred to me that, while we recognize the great advantage of the modern method of closing vesicovaginal fistulæ by separating the vaginal mucous membrane from the bladder wall and then closing the bladder independently, yet in some cases, especially those associated with unyielding scar tissue, the old Emmet method of a lateral incision in the vaginal mucosa beyond the fistula, so that the denuded edges of the opening can be brought together without tension and a satisfactory closure of the fistula obtained is good surgery. Not having seen Dr. Frank's case I cannot judge as to whether this would have been applicable. In general, however, it is not easy, and I would not think it wise to attempt to apply the modern flap-splitting operation to every vesicovaginal fistula."

DR. F. R. OASTLER said: "In listening to the doctor's paper on acute yellow atrophy of the liver I was painfully reminded of a case of twins in which the history was almost exactly the same, with the exception that my patient died. The feature that seems to me particularly interesting, and which I have always remembered in this case of mine of acute yellow atrophy, was the fact that the tempera-

ture remained normal following the birth of the twins until the sixth day when it began to rise and the condition of the liver made itself apparent. At that time I had the urine cultured and obtained a *Bacillus coli*, so that I had practically a typical history such as the doctor had given. Now what seems of interest to me is the fact that both his patient and mine went six days without a temperature and then developed the symptoms of acute yellow atrophy, and in addition the *Bacillus coli* was found in the urine. Those two features seem to me to be significant.

"There is another condition of icterus following labor which is associated with infection by the streptococcus pyogenes, and that is in puerperal septicemia. I have seen two of these cases. Both died. Both were extremely jaundiced. Both had hemorrhages from the kidneys and mucous membrane. In both cases I succeeded in getting cultures of the streptococcus from the blood, the difference being that the temperature and history of sepsis followed in the regular order of events in the puerperal infections, whereas in the case of acute yellow atrophy there was no temperature for about six days and then jaundice began. In all three cases autopsies were done. One was an acute yellow atrophy and the other two cases sepsis with associated jaundice. In the last two cases the pathological report of the liver showed a condition of active congestion with degenerative changes. I felt very badly about the case of acute yellow atrophy because it happened to be the daughter of a physician living in Syria. I wrote him at the time the exact condition of affairs and received word back that it was not a case of acute yellow atrophy but a case of puerperal sepsis, and I thought to myself at the time that I had never seen a case of jaundice associated with puerperal sepsis, but I have seen these two cases in acute puerperal sepsis since.

"In reference to the other case of Dr. Frank's, the vesicovaginal fistula, I thought when he said that the case had entered Mount Sinai and he reported that it came from one of the large hospitals where they told her nothing could be done that it was my case, because I had an almost similar case to the one he reports, the difference being that the cervix uteri was stripped up in front. The vesicovaginal fistula was situated almost exactly, although not quite as much to one side, as he related. I went to work in the same way that he did to try to relieve the condition. I found that I could not suture the bladder high up, although I was able to remove the scar tissue. I then went up above with the hope that I might be able to separate the bladder from above and found that the uterus and intestines were agglutinated to the bladder in front, so I closed the abdomen and gave the thing up as a hopeless proposition. Within three weeks it was healed by doing absolutely nothing except removing the scar tissue and allowing the tissues to fall together."

DR. W. S. STONE said: "I think Dr. Frank's first case is most interesting and important. It seems, however, unfortunate to classify it as acute yellow atrophy rather than a case of toxemia of pregnancy. From the history which Dr. Frank has given us of this

case it is evident that the seriousness of hyperemesis gravidarum, or the toxemia of pregnancy,¹ is not yet sufficiently appreciated even in New York hospitals. The case undoubtedly presented the clinical picture of acute yellow atrophy of the liver during the terminal period of its course, but such a lesion may be due to causes other than pregnancy. In consideration then of the numerous efforts that have been made in recent years to impress the profession with the importance of recognizing such a lesion as one of the serious possibilities confronting a case of hyperemesis gravidarum, I think it would be much better to designate Dr. Frank's case as one of toxemia of pregnancy. In the discussion one of the speakers has suggested the occurrence of acute yellow atrophy of the liver with sepsis. It may be of interest to the present members of the society to know that in the former transactions there is presented a very interesting and complete report of a case of acute yellow atrophy of the liver associated with puerperal peritonitis."

DR. J. O. POLAK said: "It has been our misfortune to see several of these vesicovaginal fistulæ which were close to the pubic ramus, and it has been interesting to watch the effect of local treatment on the scar tissue prior to operation. We had a case only last year where the fistula was evidently in a very similar location to that mentioned by Dr. Frank. Under local treatment—and I want to call attention particularly to the treatment of the surrounding tissues that was suggested by Emmet, *i.e.*, the management of the urine, the use of douches, Sitz baths, boroglyceride, and time—the fistulous tract changed its character very materially and we were able in that case, which we are sure could not have been done otherwise, to close it with the old-fashioned Sims' silver wire method. We were not able to separate the tissues from their intimate attachment to the pelvic bone, yet manipulation, the placing of wire sutures, attention to the urine, and the drainage catheter all seemed to do what Dr. Frank says, *i.e.*, placed the bladder in a better condition to take care of itself.

"Another interesting case that entered our service was one where a Byrne operation for cancer of the cervix had been done at St. Mary's Hospital. In this case the entire trigone and base of the bladder had sloughed away so that both ureters were turned into the vagina; we could see both ureteral orifices in the everted bladder. The amount of destruction of that bladder was enormous. We were unable to do any plastic work from below in this case, owing to the immense amount of scar tissue, so we anteverted the fundus of the uterus into the bladder and closed our fistula in that way. Another interesting case had been operated on some three or four times in one of the large hospitals in New York. The structures could not be brought together because of the immense amount of cicatricial tissue. In this case we found that by splitting the cervix by a lateral incision and placing it into the base of the bladder we were enabled to get a result. In other words, a surgeon doing reparative bladder surgery has first to attend to the condition of the tissues about the fistula, and, secondly, he has to be a utilitarian so far as the structures that he uses to close the leak with."

DR. DOUGAL BISSELL, in discussing Dr. Frank's second case, said: "I am reminded by this discussion of a case, previously reported by me before the Gynecological Section of the Academy of Medicine, in which the extent of vesical damage and ureteral complication made it the most difficult reparative work upon the bladder I had ever undertaken. In performing a Wertheim operation it was necessary to remove 2 inches of the pelvic portion of the right ureter which had been completely surrounded by a carcinomatous growth from the uterus. This mass had also involved the base of the bladder, necessitating the removal of a large part of this organ. An effort at repair was immediately made, but with resulting failure. Examination under ether six weeks after operation showed an extensive opening in the vault of the vagina. In the left angle of this could be seen the mouth of the left ureter and very high up in the right angle could be seen, in the region of the white line, the mouth of the right ureter. The problem was to denude and suture the vesical edges without injury to, or involving in any way, the ureteral mouths. No tissue was freed about the extensive scar. The operation was performed strictly according to Emmet's plan. Sixteen wire sutures were used. On their removal two weeks after, a cystoscopic examination showed a continuous line of primary union with no involvement of the mouths of the ureters."

DR. ROBERT T. FRANK, in closing the discussion, said: "Dr. Dorman's inquiry about the gauze was, I think, answered by the President. I used chromic catgut because the hemorrhage was of such dimensions that I wanted to give full chance to have the vessels occluded. I removed the hemostatic gauze on the seventh day without any additional difficulty, and I removed the drainage gauze at the same time.

"In reference to Dr. Broun, Dr. Bissell and also Dr. Polak: I by no means want to put the flap-splitting operation in competition with the Emmett operation. Emmett's operation is, in certain cases, extremely useful and is as applicable to-day as it was at the time it was first announced, but in certain cases, particularly when I find that there is tension, I think Emmett's operation is entirely contraindicated. The case reported to-night was of that nature. I realize that if it had been possible to approximate the margins of this wound without this extensive dissection and without loss of the uterus, it would have been much preferable. I have had the opportunity of doing quite a large number of vesicovaginal fistulae arising from different causes and the only thing I ask for, as a rule, is that I shall be the first man to operate. I have been unfortunate enough to encounter patients who have been subjected to three, four, five and even six operations before they came into my hands and before operating I will spend a week in studying out where to get tissue, because one of the main things in doing a vesicovaginal fistula is to operate in such a fashion that if the first operation is not successful you have not impaired the possibility of cure by removing healthy tissue. I have also used many, and probably all of the expedients mentioned by Dr. Polak, such as splitting of the cervix and various plastic

procedures, opening of the culdesac, etc. Each case requires different treatment."

"As far as the size of a fistula is concerned, this plays a comparatively slight rôle in my mind, if there is sufficient lateral tissue that can be used in repairing the fistula and if the scar is not of such proportions that it is a great hindrance.

"As far as including the ureter is concerned, I used to feel quite uncertain in large fistulæ with the ureter near the edge. I recently cystoscoped a case where evidently I must have included the ureter in my sutures. An ulcerative area persisted (corresponding in appearance to what is ordinarily described as a golf-hole ureter in cystoscopic reports) at the base of the bladder, and in spite of appropriate treatment I was unable to clear up this lesion. Just recently it struck me that this might be the ureter. The patient made a perfectly uninterrupted recovery without at any time showing any signs of having a ureteral occlusion.

"In regard to the case of hyperemesis gravidum and acute yellow atrophy: I am glad that Dr. Oastler brought out the difference between the icterus of sepsis and acute yellow atrophy. Although it is quite proper to class hyperemesis gravidum, eclampsia and acute yellow atrophy in one frame, this is not true of sepsis. It is true, too, that acute yellow atrophy is the result mostly of toxic substances, but in the examination of these three diseases the toxemia is a placental one. In the case of sepsis the toxemia is bacterial in origin. I would be quite pleased to accept Dr. Stone's change in the title if that would emphasize the fact that hyperemesis and acute yellow atrophy are of the same clinical degree and one may run into the other."

DR. HERMAN J. BOLDT reported the following cases:

SQUAMOUS CELL CANCER OF THE CERVIX.

This patient, aged forty, had one child twenty years ago. She complained of a "watery leucorrhea." Examination showed a uterus somewhat fixed by previous inflammation and a cervical tear presenting a distinct erosion. The latter looked suspicious enough to warrant further examination and the microscopic section showed a marked proliferation of the epithelial cells lining the cervical mucosa. The latter was partially obliterated and the basement membrane had disappeared. The submucous coat was infiltrated by epithelial cells and the connective-tissue cells were hardly visible. There was a marked cell infiltration of the muscular tissue including the epithelial cells, lymphoid cells, leukocytes and plasma cells. The pathological diagnosis was a squamous cell carcinoma. A radical operation was done on September 22, followed by an uneventful recovery. The examination of the specimen confirmed the previous pathological findings.

The case was presented for the purpose of calling attention to the necessity of excising tissue from an eroded cervix when there is the slightest suspicion of a possible malignant condition.

CHRONIC METROENDOMETRITIS OR FIBROSIS AND MARKED INTERSTITIAL SALPINGO-OOPHORITIS.

Mrs. M. H., aged twenty-nine, had been an invalid for the past year, complaining of pain in the lower abdomen, which was most marked in the left iliac region, and also of leukorrhea. Operation was done on October 2, and a complete hysterectomy and appendectomy done. The pathological examination showed an exceptional hypertrophy of the walls of the Fallopian tubes. The patient made an uninterrupted recovery.

TUBAL ABORTION AND CHRONIC APPENDICITIS.

Mrs. F. A., aged twenty-eight, married five years, had one child three years ago and a miscarriage four years previously. The present illness began August 20, and she was first seen by Dr. Boldt on September 29. There was a typical history of tubal gestation. Examination disclosed sensitiveness upon moving the vaginal part of the cervix, otherwise the pelvis was negative. There was also pain over the appendiceal region. The patient had been curetted by her family physician who claimed that typical placental tissue in large pieces had been removed, *not decidua*. A diagnosis of doubtful ectopic pregnancy was made, although no evidences of an hematocele or an enlarged tube was present. The patient was removed to the hospital for observation and the cramp-like pains gradually subsided. As the appendiceal tenderness continued an operation was determined on. During a preliminary narcosis with pantopon-scopolamine and novocain intraspinal analgesia the abdominal walls were sufficiently relaxed to permit of a more careful bimanual examination. A small mass was felt near the right cornua, but no positive diagnosis of tubal gestation could be made out. When the abdomen was opened the fecundated tube was found to be drawn up and attached to the appendix. There was no free blood in the peritoneal cavity and the case might have terminated satisfactorily without surgical intervention.

DR. HERMAN GRAD reported

TWO CASES ON ECTOPIC GESTATION.

"The object in presenting these two cases of ectopic gestation is to bring out a discussion on the atypical symptoms presented by the cases. In the first case, there were symptoms that pointed to a severe infection, while in the second case the symptoms were so few as to be misleading. In the first case the diagnosis of ectopic was missed on account of the marked symptoms of sepsis present. There was a very sharp rise of temperature with all the evidence of pelvic infection, and yet at the time of operation no pus was found, nor any evidence of bacterial infection in the tissues of the pelvis. The history of the case is as follows:

"Mrs. K., aged twenty-six, was seen in consultation April 19, 1915. The history was that the patient had been in bed for one week, and

during this week there were sharp rises of temperature, sometimes reaching up to 104° F. and pulse correspondingly high. The patient had been married ten years and had two children. She also had one miscarriage four months previous to this illness. She stated that her menses began at the age of fourteen, were always regular, of a five-day duration and free from pain. Her last menstrual period occurred February 5, 1915. She had not menstruated on the corresponding day of the month of March, but on the 27th day of March, she began to flow slightly and practically flowed until now with very little interruption. She said that on April 18, the day previous to my consultation, she was taken with severe pain in the lower part of the abdomen and back. She vomited and felt weak, but did not faint. She turned pale and perspired freely. This lasted for three hours, but it is to be noted that she had several attacks of pain during the month of April. The last attack was more severe than the ones previous. Her temperature at this time was 104° F. and pulse 120.

"Examination of the abdomen revealed great tenderness in the lower part with rigidity of both recti muscles. There was distinct evidence of extreme peritoneal irritation. The slightest touch caused pain and it was impossible to palpate the abdomen no matter how gently one attempted to do this. Examination by the vagina showed an extreme tenderness in the pelvis and a full culdesac of Douglas. A tentative diagnosis was made of pelvic abscess and the patient sent to the hospital for operation. When she arrived at the hospital, her temperature was 103.8° , pulse 130 and the patient looked very ill. She complained of dizziness, she vomited several times and was in extreme distress. She complained of pain in the abdomen which required administrations of morphine. A blood examination was made on her arrival at the hospital and it was found that the white cells numbered 27,000 while her polymorphonuclears were 82 per cent. Early the following morning the patient was anesthetized and the culdesac of Douglas opened. To my great surprise, instead of pus a large quantity of dark blood escaped. It was very evident that I was dealing with an ectopic gestation, but why these extreme high temperatures? To clear up the case and operate as concisely as possible, the abdomen was opened in the median line and a large amount of both free and blood clots escaped from the abdomen. There were several adhesions found around the right tube and a tubal abortion had taken place. The right tube was removed without disturbing the ovary. A large blood clot was removed from the pelvis and the pelvic cavity was inspected for the presence of pus. No evidence of pus formation was found anywhere. The case looked like any ordinary case of ectopic gestation. The mystery of the rise of temperature was not to be explained on the ground of bacterial infection in this case. Having an opening in the culdesac, a piece of gauze was placed for drainage and the abdomen closed in layers. The patient was returned to bed in good condition and within three days the temperature dropped to normal. The patient made an excellent recovery. The culdesac drain was removed on the third day and no complications occurred.

"The question may be asked why this high temperature in a case of ectopic gestation, and by way of comment I wish to call attention to the paper read by Victor C. Vaughn at the Annual Meeting of the Medical Society of the State of New York, April 27, 1915. Dr. Vaughn says in reference to fever:

"All bacteria are capable of inducing fever and this is a most constant accompaniment of infection. Fever is not directly due to the growth of bacteria in the body. It is not until the body becomes sensitized against the invading organisms and begins to digest and destroy them that fever makes its appearance. The fever of infection results from the parenteral digestion of the bacterial proteins. He says further: "More recently it was shown by experiments in the writer's laboratory that fever can be induced in animals by the subcutaneous injection of proteins of diverse origin and structure and by modifying the size and frequency of the dose, the type of fever can be determined as well. By injecting egg-white into rabbits and by regulating the size and interval of one dose, one may induce intermittent, remittent, continued or acute fever. In the last mentioned, the temperature can be carried to 107° F. with a fatal termination.

"May it not be that in this case we have to deal with a temperature that was due to parenteral digestion of protein material, which was derived from the tissues of the gestation sac after the tube had ruptured and expelled its contents into the parenteral cavity?

CASE II.—"In this case the symptoms of ectopic were so mild that it almost escaped attention and might have led to an error in diagnosis. The case is one of a young woman, aged twenty-four, who had been perfectly well up to Sept. 15, 1915. She had menstruated perfectly well on August 12, was due to menstruate Sept. 11, but did not menstruate until Sept. 12. On Sept. 12, while at dinner, she was seized with a sharp attack of pain in the abdomen, felt faint and had to leave the table. Within a few hours she felt well enough to walk home, a distance of eleven blocks. The following day she went to business and apparently was well, but on the 18th she had another attack of abdominal pain, but not so severe as the first, and attributed both these attacks to indigestion. She remained in bed for three days with soreness in the abdomen, as she expressed it. She was seen in consultation on Sept. 22 when the following conditions were found: She had a normal temperature, pulse 80, tenderness in the lower part of the abdomen on deep pressure. Bimanually it was found that when the cervix was pressed on it elicited pain, and a small ill-defined mass was palpable on gentle palpation. In view of the history, a tentative diagnosis of ectopic gestation was made and the patient sent to the hospital. Blood examination here showed that she had a white cell count of 13,000 and the polymorphonuclears were 76 per cent., hemoglobin 90 per cent. and red cells 4,500,000. She was put to bed, the soreness in the abdomen completely disappeared, no temperature arose and the patient felt perfectly well and was anxious to leave her bed and go home. She was advised against this because the pelvic examination showed this

ill-defined mass in the pelvis. Finally on Sept. 28 the patient consented to operation, and on opening the abdomen in the median line a large quantity of dark blood, both free and clotted, escaped. The tube was brought into view and the tubal abortion was found with the fetus intact in the sac as shown in the specimen. Here we have a case where a large amount of free blood is found in the peritoneal cavity from the tubal abortion, and yet the symptoms were so few that the patient considered herself absolutely well and was anxious to leave the hospital."

DISCUSSION.

DR. W. E. STUDDIFORD said: "I was wondering whether Dr. Grad's case possibly could have been one of those cases of a mild peritonitis where there is possibly a colon infection which gives a temperature and which after operation very frequently clears up. I think a great many cases of ectopic develop a temperature, and one of the most confusing things in diagnosis in the old cases, such as Dr. Grad has given us here, a case which has been bleeding a long time, is to distinguish between a pelvic abscess and ectopic, and the result is very surprising. We make a diagnosis of ectopic and find pus. We make a diagnosis of pus and we find an ectopic. I feel that Dr. Grad's experience has been the experience of all of us.

"His second case is rather typical. I know of one case during the summer at Bellevue in which the woman gave a typical history of ectopic, so far as the menstruation was concerned and pain, and yet on examination it was impossible to find any mass in the pelvis.

"She was put to bed and kept in bed for ten days with this persistent pain, which was high up on the left side, and in spite of frequent examination no tumor mass could be felt, but the pain was so severe that finally we submitted her to operation, and on operation we found a very unusual condition of the tube. The Fallopian tubes in this case were the longest I have ever seen; not only the Fallopian tubes, but the ovaries, were well up over the brim of the pelvis and the rupture or tubal abortion had occurred behind the sigmoid, up in the iliac fossa, so the clot was imbedded behind the sigmoid with the end of the tube. It was, of course, impossible to palpate that by either vaginal or external manipulation. The right tube was in the same condition.

"The atypical cases of ectopic are most interesting." After referring to the blood count in these cases, Dr. Studdiford continued, saying:

"Dr. Grad has a high blood count in this case which was possibly due to the acute hemorrhage which had occurred just prior to the operation."

DR. S. WIENER said: "I would like to ask Dr. Grad whether, to his knowledge, a sound was passed into the uterus before he saw the patient, or whether there was any intrauterine manipulation in the case with temperature. I don't think it is an infrequent occurrence in hospital cases that have been curetted outside before they come in,

or in which a sound has been passed in order to facilitate the diagnosis, to find a temperature of 103° F. and a high leucocyte count; in other words, infected ectopics and ectopics infected through the uterine cavity are perhaps not unusual."

DR. F. R. OASTLER said: "I have just been working during the last three weeks on 107 cases of ectopic gestation which I have operated upon in the last number of years and I find that the range of temperature in ectopics is from 97° F. to 104° F., and that almost all of the ectopics have some temperature, the average being from 99.2° F. to 100° F. There are sporadic cases in which the temperature will run up to 102° or 103° . I feel that the cause of the rise of temperature in these cases is due to one of three different things. For instance, we have all noticed that if two people have an attack of tonsillitis one temperature will rise to 102° or 103° , while another with practically the same condition will have a temperature of 105° ; there is often a peculiar idiosyncrasy to develop a high temperature on the slightest provocation. I think that in some of these ectopic cases the temperature is due to the rapid absorption of fibrin ferment, and the person having this peculiar idiosyncrasy will have a higher temperature than an ordinary person who may have absorbed the same amount of fibrin ferment. I think this accounts for the rise of temperature in one class of cases. The rise of temperature in another class of cases may possibly be caused by infection. Such infections do occur, for I have succeeded in growing the *Bacillus coli* from the pelvic contents of a patient suffering from tubal pregnancy. The third class of cases where we may get a high temperature has already been mentioned by Dr. Studdiford—the old ectopics, where there has been considerable time for absorption of blood clot. This rise is comparable to the ordinary postoperative rise of temperature due to the absorption of blood clot, catgut, loose tissue, etc."

DR. HERMANN GRAD, in closing the discussion, said: "In reference to Dr. Studdiford's remarks to the effect that old cases of ectopic have temperatures, I feel that this will hold good in many cases. I have a case in the hospital at present where the ruptured ectopic is two months old. She was curetted two months ago for bleeding and came in with a big mass of clots in the abdomen. The ectopic sac had become adherent to the sigmoid and it was a difficult case to get rid of, and yet she did not have a particle of temperature and has had none since the operation.

"In reference to Dr. Wiener's remarks about the use of a sound, I can say positively that there was no intrauterine manipulation in this case. The man who took care of the case for a week before I saw her would not do that. He did not even make a vaginal examination, so I don't think that will hold good in this case. He only examined the abdomen. He supposed she had peritonitis and let her alone, but called a surgeon in to empty the pus.

"In regard to Dr. Oastler's remarks about idiosyncrasy, of course that may hold good, but I feel that in this case there was no infection of the ectopic sac. It looked like an ordinary case of ectopic which was not infected. There was no sign of any bacterial invasion in the pelvic cavity, yet she ran this high temperature."

DR. FRANK R. OASTLER presented

THREE CASES OF EXTRAUTERINE PREGNANCY.

The first was in a woman thirty years of age, married five years, two normal labors and no miscarriages. She had menstruated normally three weeks ago and one week ago menstruated again for four days. Eighteen hours later she was suddenly seized with violent pain in the lower abdomen, became faint and went to bed. The condition grew rapidly worse and when admitted to the hospital she was in collapse with imperceptible pulse, dyspnea and evidences of internal hemorrhage. The blood count showed 33 per cent. hemoglobin, 2,500,000 red cells, 35,000 white cells, with 88 per cent. polymorphonuclear cells. The abdomen was greatly distended, slightly tender and rigid. A bimanual examination showed the whole pelvis filled with a boggy mass which surrounded the uterus. The patient was immediately given a dose of morphine, placed on the operating table and a saline infusion started. A median abdominal incision was made, but death followed immediately. Examination of the abdominal cavity showed the pelvis to be full of blood clots and a ruptured ectopic at the left horn, which apparently involved the ovarian artery.

The case was presented as an argument against delayed operation in the so-called fulminating varieties of ectopic pregnancy, as a large vessel in this instance was involved, which failed to stop the bleeding.

The second case was a woman thirty-five years of age, had been married fourteen years and never previously pregnant. The last period occurred four months ago when the patient bled for four weeks steadily and then stopped. A progressive enlargement of the lower abdomen was noticed. Pelvic examination showed a rounded mass extending to within an inch of the umbilicus, the right half of which was cystic in character, the left half irregular and hard. The cervix was soft, the right adnexa normal, but on the left side in the region of the tube a firm, rounded, movable, tender mass about the size of a small orange could be palpated. On opening the abdomen the uterus was found to contain a fetus and in the left tube close to the uterus an old clot presented the appearance of a tubal pregnancy. The left tube was removed and the uterine pregnancy continued uninterrupted. The pathological examination showed a fetus and chorionic villi in the left tube. In this instance intra- and extra-uterine pregnancy were associated.

The third patient was thirty-two years of age, and had been married four years. There was a history of a right tubal pregnancy two years previously with operation and an uninterrupted recovery. There were no children or miscarriages and no knowledge of any pelvic inflammation. The patient menstruated normally two weeks previously for four days. Two days before being seen she began to stain slightly and complained of acute pain in the lower abdomen on the right side. The abdomen was found to be slightly distended in the lower portion with some rigidity and tenderness. The uterus

was slightly enlarged, in a normal position, tender, and the cervix soft. The culdesac was filled with a soft boggy mass continuous on either side of the pelvis. The blood count showed 4,000,000 red cells, 10,000 white cells and 78 per cent. polymorphonuclear cells. At operation the pelvis was found to be filled with blood clots. The left tube and ovary were normal and at the site of the stump of the right tube there was a tubal pregnancy which had ruptured.

DISCUSSION.

DR. W. P. HEALY said: "As to the case of interstitial ectopic gestation, the only instance of death resulting from hemorrhage of an ectopic gestation which has come under my observation was in a similar case, without operation, however. The patient had an interstitial ectopic gestation which ruptured. She was brought into the hospital by ambulance, but died on the way in, and at the postmortem examination we found what resembled a bullet hole in the horn of the uterus near the site of the uterovarian ligament, and microscopical examination of the tissues showed that there had been an interstitial ectopic gestation present at that point; so that unquestionably, as we all know, such a gestation rupturing, even though it be very early, is apt to lead to the prompt death of the patient from a severe internal hemorrhage."

DR. W. E. STUDDIFORD said: "I feel that the question of hemorrhage in ectopic pregnancy was very well summed up by Joseph Price, a good many years ago, when he stated that rupture at the inner third of the tube belonged to the coroner, at the outer end of the tube belonged to the surgeon and the middle third was debatable ground. I think that is the answer to Dr. Oastler's proposition. I don't think it would have hurt to wait in that case and the result would have been no different."

DR. HERMANN GRAD said: "In reference to the question, whether a gestation in the tube can rupture into the uterus, I believe that it is easier to answer that question by saying that the woman under consideration had also very likely a pregnancy in the uterus, rather than that the tubal pregnancy had become intra-uterine. In this connection I would refer to an illustration in Kelly's text-book on gynecology, where he shows an ectopic in one tube and pregnancy in the uterus, while a transmigration of the ovum had occurred from the ovary on the side where the ectopic was. I think we can explain those cases of pregnancy physiologically and believe that an ectopic of the tube had become a uterine pregnancy. Some years ago I was interested in the subject of cornual pregnancy, and in looking up the literature on the subject I found that during that period when they were curing ectopic gestations by electricity that they talked a good deal about forcing the ectopic sac into the uterus and have it come away in that manner. Experience has shown that this does not occur."

DR. F. R. OASTLER, in closing the discussion, said: "The only thing I would like to say with respect to the division of the tube into two

parts, as already given by Dr. Studdiford, is that I don't quite agree with him, because in the three cases of interstitial rupture that I have had two were operated and both recovered, and the third one was lost. One of these cases I showed to the Society some two years ago with a specimen."

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of October 7, 1915.

The President, DANIEL LONGAKER, M. D., in the Chair.

DR. F. B. BLOCK (by invitation) read a paper entitled

OBSERVATIONS UPON THE TREATMENT OF DYSMENORRHEA.*

DR. WILLIAM E. PARKE.—For about a year we have been administering at the Kensington hospital dispensary the mammary extract for dysmenorrhea of the type that has been mentioned. We have found in some instances that the results are satisfactory. My own personal experience has not been very large.

DR. F. HURST MAIER.—I have listened to the doctor's paper with a great deal of interest. It seems to me that the indiscriminate use of drugs in the treatment of dysmenorrhea is an admission that we have not determined the cause of the condition. True, the causes that give rise to it are many; as a rule, however, a careful study of the cases will usually result in the discovery of definite etiologic factors.

I am sure that those of us who have used atropine in spasmodic dysmenorrhea will agree with the Novak's concerning its efficiency.

Furthermore, I believe that the future will clear up many of the so-called cases of idiopathic dysmenorrhea, and show them to be due to perversions of the internal secretions, the correction of which will only be accomplished by the administration of the proper glandular extracts.

I have had several cases of hypoplasia of the uterus, in which the scanty, painful menstrual periods became normal after the use of pituitary extract. The results obtained with pituitary and thyroid extracts in the treatment of sexual infantilism associated with adiposity have been extremely good. Their administration is often followed by a decrease in weight and the establishment of a normal menstrual flow.

Similar results are obtained from the use of lutein or the ovarian extracts, in the functional disturbances incident to ovarian atrophy.

It is quite probable that our lack of uniform results in organotherapy is due to an insufficient physiology of the ductless organs.

* See original article page 945.

With our present knowledge much may be accomplished if we will bear in mind the interrelationship that exists between the different glands, and that greater efficiency is often obtained by the simultaneous use of a number of their secretions.

Apropos of the use of the stem pessary, one must not forget that the uterus is often in a position of retroversion as well as antelexion, and that the maintenance of the instrument in the uterine canal is dependent upon the cervix being at an acute angle to the axis of the vagina. This is best obtained by doing one of the many operations for the shortening of the round ligaments.

DR. JOHN A. MCGLINN.—I want to think that I know something about the subject of dysmenorrhea but I practically know little about it. I see very few cases and I have been so unsuccessful in treating them that they do not come back. In the cases I do treat I am impressed with the multiplicity of causes, and the impossibility of determining the one in the individual case. I have been very much impressed with the nasal treatment of dysmenorrhea and was interested when Maier and Brettauer first published their reports. It is rather significant that they have published nothing since. I hope the Society will recall that Dr. O'Reilly read a paper on the subject at one of our recent meetings. I have tried the method but am not in a position to judge of its merits. I find that but few of the nose men credit the treatment and that it is hard to interest them. They do not seem to know where the genital spot is. My own experience in the few cases has not been particularly favorable. The same is true with my experience with the atropine treatment which I have been using since Novak's paper. Even when you remove a definite lesion there is often no relief. In the case of woman who had acquired the habit of taking 20 grains of morphia a day for the relief of her dysmenorrhea the removal of a solid tumor of the ovary was without result. She came back and recalled to my mind that she had at one time fallen down stairs. Upon the supposition of a dislocated kidney I did a nephropexy and the dysmenorrhea cleared up entirely. I recall a case in which following the opening of the abdomen the dysmenorrhea disappeared. The subject is such a complicated one that I believe we shall obtain results only when we are able to diagnose the particular type and determine the cause. I have worked pretty hard on the matter for a number of years and I must confess my inability in the great majority of cases to be sure of the underlying condition.

DR. EDWARD A. SCHUMANN.—Some years ago a hundred dollars worth of tablets of extracts of practically all the ductless glands then on the market were presented to a hospital with which I was connected. These included ovarian extract, corpus luteum, thyroid, mammary gland, testicle. We tried to separate the dysmenorrhea cases into special types. I do not think personally that we ever separated them into any types. Almost all were hypoplastic; almost all had small cervixes in which it seemed that dilatation would be of benefit. There was such great difficulty in determining the so-called ovarian dysmenorrhea that we gave the matter up in despair. We

then treated the cases with the various glandular extracts. First, the ovarian for two or three months and followed that with thyroid and the other preparations. In the 150 odd cases seen during the five years in which the treatment was carried out I do not believe any were benefited. There may have been errors in dosage or in classification but we saw no benefit.

DR. ALFRED HEINEBERG.—I would like to say a word in dissension. I feel that the assurance with which the author casts aside the so-called obstructive type of dysmenorrhea is a little bit too bold. We have all seen cases of so-called obstructive dysmenorrhea—cases of acute ante flexion of the cervix—which had a good menstrual flow. They have been dilated and a stem pessary inserted and still they did not get better. I would like to ask Dr. Block if he will tell us how in this classification we can tell which belong to the obstructive type and which belong to the other two types mentioned. That is going to be the crux of the situation. A classification according to symptoms I do not believe will answer. I believe that when this question is more thoroughly understood it will be found to be much more complicated than it appears from our present knowledge. Most of the cases of dysmenorrhea seen in the Jefferson Hospital Dispensary have seemed to be cases of rudimentary development of the uterus and we have had perhaps some improvement in them by the administration of hormones. We have treated these cases instrumentally but did not seem to get satisfactory results. Assuming that atropine gives relief to the dysmenorrhea will it give permanent relief? If not, we are as much in the dark as ever concerning treatment of dysmenorrhea.

Dysmenorrhea, as I see it as a general practitioner, is usually a functional disturbance. The result of transgression against biologic law, the result of unused or misused organs.

Very often childbirth clears it up, not from dilatation of an ante flexed uterus but more probably from return to normal functioning of the pelvic organs.

I have obtained some excellent results with the use of dried mammary substance. But it is often difficult to get it of uniform activity, probably due to the lack of care in obtaining only the udders of fresh ewes or cows.

DR. GEORGE M. BOYD.—I want first to thank the reader of the paper for his contribution to this subject which I might style the *bête noire* of gynecology. I think Dr. Good has the line of thought which may be productive of great good in this work, although my opinion at present is, that we are far from any ability to classify these cases. Whether much of the effect of the severe methods of treatment is psychic it is difficult to say. Many of the cases appear to be those in which there is a hypoplasia, an ill developed and idle uterus or the infantile uterus. With the insertion of a pessary there is better functional action and the dysmenorrhea disappears. We have other methods of treatment and we think they are of service but it may be that the effect is purely mental. We are therefore treating many of these cases in the dark. I am inclined to believe

that there may be a multitude of causes surrounding this condition. After pregnancy, as a rule the patients for several years are free from pain. If they have no more children the dysmenorrhea reappears. We can scarcely include the obstructive type in that group. However, pregnancy seems to be a most reliable treatment.

DR. BLOCK, closing.—The first thing I have to say in closing is that I am not trying to champion all of the ductless glands. I have used adrenalin, the others I have not tried; in the ovarian type of dysmenorrhea this has given me good results.

There is no hard and fast rule in classification. Dr. Heineberg objected to my speaking so boldly of the obstructive type. I referred to the gross obstructions. In many of these cases there is an ante flexion of the uterus and in these the stem pessary should be tried. This may not give permanent relief, but if there is sharp ante flexion some benefit will result. I also spoke of retroversion causing pathological obstruction. That type often gives the same symptomatology as the third, or vagotonic type which latter is diagnosed by ruling out any organic condition. I grant that in many cases this is difficult to do. If there is moderate ante flexion it will be difficult to tell whether it belongs to the obstructive type. There is a sharp line to be drawn, however, between the obstructive type and the ovarian type. One has the marked pain before the period relieved by the flow. In the other type pain begins with the flow and is lateral in location. The two types stand out in strong contrast.

Especially in the ovarian type adrenalin will give good results. The subject is a large one and it remains for many others to make further investigations in this field.

DR. GEORGE W. OUTERBRIDGE reported a case of

CHORIOEPITHELIOMA OCCURRING AFTER A LONG PERIOD WITHOUT GESTATION.*

DR. HARTZ.—Last year I had occasion to exhibit before the Pathological Society three specimens of chorioepithelioma. In one of these the tumor had developed six years after the last pregnancy. The mass was in the uterus and was 7 cm. in diameter. In recent years attention has been called to the fact that syncytial cells are at times deposited in parts of the body remote from the uterus. There they may lay dormant for a considerable length of time before resuming active growth. This is exemplified in Dr. Outerbridge's report, the tumor having developed in the vagina years after the last known pregnancy. Chorionic villi are frequently retained in the uterine cavity after an incomplete abortion. In most instances these are expelled by a liquefaction necrosis, while in not a few cases the villi undergo fibrous change and give rise to various degrees of metrorrhagia and menorrhagia, necessitating their removal with a curet.

DR. F. HURST MAIER.—I had the pleasure of reporting a case of

* See original article, page 952.

chorioepithelioma before this Society several years ago. In my case there was no physical expression of the growth until one and a half years after the pregnancy.

I am quite in accord with Dr. Outerbridge's view in respect to the possibility of this growth developing at any time subsequent to the pregnancy.

It is true that where many years have elapsed between the pregnancy and the occurrence of the growth there exists always the possibility of the individual having had an early missed abortion.

Considering the parasitic character of the growth, its clinical behavior, and comparing it with sarcoma; the length of time that often ensues between the latter's development and the preceding trauma offers a striking parallel to the delayed development in chorioepithelioma.

DR. CHARLES S. BARNES.—I have observed a few of these cases pretty closely in the Jefferson Clinic and elsewhere and one question has occurred to me especially: Why in this particular type of malignant growth do we have metastasis especially in the vagina and vulva? Cases have been reported in which the growth is first noticed at the vulva. It is not uncommon to have this without metastasis to other parts of the body. In a case seen recently in the Garrettsen Hospital, bleeding had come on and there was some doubt whether or not it was an irregular menstruation or an early abortion. Upon examination the cervix was somewhat patulous and I could feel something in the cervical canal. I believed the woman was having an abortion. In cureting her I thought at first that there were simply the remnants of a miscarriage, but the case looked a little suspicious to me. The specimens were sent to the laboratory. The report was of chorioepithelioma malignum. There had been delay in the return of the report and the woman had left the hospital. She fell into the hands of another for hysterectomy. This illustrates the advantage of routine examination of scrapings of suspicious character.

DR. EDWARD A. SCHUMANN.—With regard to Dr. Barnes' question, metastasis of uterine growths to the vagina is a complicated and interesting process. Some years ago von Recklinghausen pointed out the frequency of such metastasis taking place by means of a retrograde current in the lymph channels, causing a reversal of the normal direction of lymph movement and permitting the passage of malignant tumor elements from the uterus and upper genital tract into the vagina.

DR. OUTERBRIDGE, closing.—I am not in position to state the ultimate result in this case, as the operation was performed only last May. So far as I know there has been no word from the patient since and I believe she is still alive, but the time is not long enough to make any definite statement. Many of these cases with a long period before recurrence have been exceedingly malignant; a number are reported to have died with extensive metastases.

Dr. Schumann's theory for the frequent lodgment of metastases in the vagina is interesting, but I have been under the impression that probably the rich plexus of veins about the vagina, in close

association with the blood supply of the uterus, might perhaps be a simpler explanation of this than retrograde transport through the lymph channels. Chorioepithelioma is, as we know, a tumor whose relation to the blood-vascular system is much more pronounced than to the lymphatic.

DR. PHILIP F. WILLIAMS reported a case of

PERINEAL CONDYLOMATA DURING PREGNANCY.

The occurrence of such growths is not rare during pregnancy, but the following case is reported on account of several points of interest: The unusual size of the tumor, its rapid growth, that it complicated well-advanced pregnancy and its removal, necessitating an extensive plastic operation, did not interfere with the pregnancy.

The history of the case follows: M. M., No. 56379, primigravida, white, married, aged eighteen years, was admitted to Dr. Girvin's service at the Presbyterian Hospital June 14, 1914.

Menstruation had been established February, 1913, and was irregular in periodicity and duration; there was slight dysmenorrhea. She was married in August, 1913, and her last menstruation occurred September 29, 1913. She complained of a growth on vulva, causing pain on walking and interfering with defecation. This growth she averred had only been noticed during five weeks, beginning as a small wart on the labia.

On examination a mass of condylomata was found covering the anus, perineum and lower two-thirds of the vulva. There was a foul-smelling leukorrhea. The patient had a normal intrauterine pregnancy advanced six and one-half months.

Carefully made and repeated smears failed to demonstrate the presence of the gonococcus. Complement-fixation test for gonorrhea and Wassermann test were negative.

On June 18, 1914, after the usual preparation and under ether anesthesia the growth was removed. The excision laid bare a large area of the perineal surface and vulva. This was closed with silkworm-gut sutures approximating the cut skin margins. A large number of smaller growths were removed with scissors, cautery and ligature about the base.

The patient reacted well from the operation, there being no disturbance of the pregnancy. During convalescence a dusting powder of calomel and starch was used locally and a few small growths touched with silver nitrate.

The patient was later transferred to the maternity ward, when she was delivered spontaneously of a 6-pound baby. The puerperium was uneventful. Notwithstanding the recent plastic operation, no laceration of the perineum occurred.

Pathological Report.—Tumors measured $12 \times 5 \times 6$ and $15 \times 6 \times 4$ cm. On section a papillomatous growth, covered with proliferating epithelial cells and having a fibrous tissue stroma.

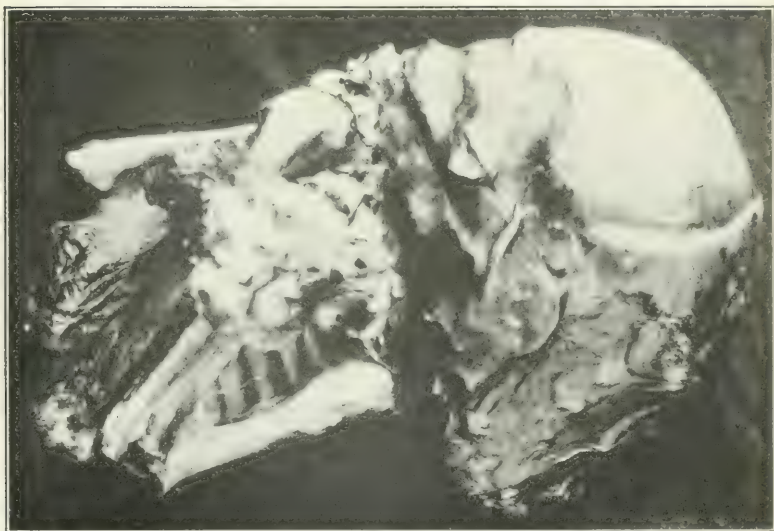
Pathological Diagnosis.—Benign fibro-epithelial papilloma.



Condylomata of vulva during pregnancy—on admission to hospital.—(*Williams.*)



Condylomata of vulva during pregnancy—during the puerperism.—(*Williams.*)



Extrauterine Lithopedion (six months).—(*Maier.*)

DR. F. HURST MAIER, Philadelphia, reported a case of

EXTRAUTERINE LITHOPEDION.

The lithopedion that I present to the Society this evening is one that was removed from the abdomen of a patient of Dr. Bergeron.

She was a negress aged forty years, married, whose family and personal histories were negative.

Menstruation first occurred at the age of thirteen years; the flow, which appeared every twenty-eight days, lasted five days, and until the past year was without pain. Her last period occurred just before her admission into the hospital, on August 20, 1915.

Patient has had two full-term pregnancies, the labors of which were without incident.

Her present trouble began twelve years ago. While six months pregnant, she fell down a well and injured her abdomen. Immediately afterward she suffered from severe abdominal pains and profuse hemorrhages from the vagina. These symptoms continued intermittently for two weeks, when they ceased.

During this time no material was discharged that in any way resembled products of conception.

After the abdomen had again become normal in size, the patient noted a hard mass midway between the symphysis and the umbilicus. This mass was about the size of a large egg, freely movable, did not appear to increase in size, and only on strenuous exertion gave rise to distress.

It was only within the past year that the patient has had symptoms sufficient to induce her to consult a physician. These were confined to the lower quadrant of the abdomen and of no definite character.

In the presence of an enlarged irregularly nodulated uterus, a dense tumor to the left of it, and the hard movable mass floating above, a diagnosis of fibroids was made.

Operation, hystero-salpingo-oophorectomy, 8-22-15, at St. Joseph's Hospital, revealed the hard movable body to be a calcified fetus that floated fairly free in the abdominal cavity, just above the brim of the pelvis. The tip of the omentum and a few coils of the intestines were lightly adherent to its surface. It was attached by a short calcified pedicle, the remains of the umbilical cord, to a dense mass in the posterior surface of the left broad ligament that consisted of a hard calcareous area, the former placenta, the tube and the ovary.

To the reporter the case presents a number of features of unusual interest: First, the uncommon termination of the extrauterine pregnancy; second, the absence of symptoms during the six months that the individual carried the viable gestation; and third, the comparatively harmless course of the rupture.

CORRESPONDENCE.

NITROUS OXIDE-OXYGEN ANESTHESIA.

To the Editor:

An effort has been recently made to introduce nitrous oxide-oxygen anesthesia in the Kansas City General Hospital. Having noticed in the *Journal of the American Medical Association* the letter of Dr. James F. Baldwin, of Columbus, Ohio, requesting information as to deaths from nitrous oxide-oxygen, a number of letters were written by members of the hospital staff to surgeons and obstetricians in the great clinical centers asking an expression of opinion based on personal experience with the gas, before concluding as to the safety of the combination.

No doubt can be felt after these letters that the conclusion of Dr. Arthur Dean Bevan, as expressed in the *Journal A. M. A.*, Oct. 23, 1915, is correct: "nitrous oxide in the hands of the tyro is a most dangerous anesthetic." Dr. Ochsner writes he used the combination in 100 cases and then gave it up, as he considers the advantages simply in the way of advertising—that the effects are psychical. In common with nearly all the surgeons from whom reports are had, he considers ether by the open method the ideal safe anesthetic.

Dr. Charles H. Mayo writes he concludes nitrous oxide in general hands more dangerous than chloroform, when it was given up at the Rochester clinic. Dr. Baldwin writes that he has notes of fifteen deaths from this combination in Columbus alone and a number of others are said to have occurred in Cleveland, Cincinnati, Baltimore and Nashville, and here in Kansas City. If these reports are the facts and if there exists, as Dr. Baldwin says, "a conspiracy of silence among anesthetists to cover up their nitrous-oxide deaths," because the popularity of the method in the hands of some of the best operators with highly trained anesthetists has caused the method to be attempted by those without training and disaster has followed, it is fortunate that Dr. Baldwin has set out in his investigation, and the results should be given the widest professional publicity in the interests of both patient and operator.

Dr. A. R. Warner, of Lakeside Hospital, Cleveland, believes the mortality is due not so much to method as to the impurities in the gas, and they hope to make it safer by a process of purification which he has devised for the removal of the halogen acids.

It would seem that the question to be determined is not what results a brilliant surgeon like Dr. Geo. W. Crile reports nor whether Dr. J. Clarence Webster, a distinguished obstetrician with the best trained anesthetists, has any mortality. What is the death rate from the average clinic or in the practice of the physician who is handicapped, doing his work without the refinement of equipment of the great hospitals? If death occur with such startling frequency as has been claimed, no further discussion is necessary.

GENERAL HOSPITAL OF KANSAS CITY, GEORGE C. MOSHER, M. D.
KANSAS CITY, MO.

Nov. 16, 1915.

REVIEWS.

PHYSIOLOGICAL CHEMISTRY. A Text-book and Manual for Students.

By ALBERT P. MATHÉWS, PH. D. Professor of Physiological Chemistry at the University of Chicago. Illustrated. Pp. 1040. New York: William Wood & Company: 1915. Price \$4.25 net.

He who starts to read this volume expecting to find the usual dry-as-dust manual will be greatly disappointed, for the book opens the door into one of the fairy lands of science where at every step one finds that which stimulates his imagination and excites a desire that pushes to further inquiry into the great and, as yet, largely unsolved problems of biochemistry. To arouse interest in the subject, to stimulate curiosity and inquiry, are most important factors in successful teaching and these factors have been developed by Dr. Mathéws to a very unusual degree in this book.

The ground covered is too great to be discussed in detail. It is sufficient to say that it has been brought strictly up to date, that it contains much that is original with the author, and shows a wide knowledge of the vast literature of biochemistry. Its chapters include: the general properties of living matter, the carbohydrates: the lipins: the proteins: the physical chemistry of protoplasm, animal heat: the raw materials or foods: salivary digestion: digestion in the stomach: digestion in the intestine: absorption: the circulating tissue, the blood: the master tissue of the body, the brain: The contractile tissue, muscle: The connective, or supporting tissues: The cryptorhetic tissues: The excretions: metabolism under various conditions: and a section on practical work and methods.

TEXT-BOOK OF NERVOUS DISEASES FOR THE USE OF STUDENTS AND PRACTITIONERS OF MEDICINE. By CHARLES L. DANA, A. M., M. D., LL. D., Professor of Nervous Diseases in Cornell University Medical College; Consulting Physician to Bellevue Hospital, etc. Eighth edition. Pp. 632, with 262 illustrations, including four plates in black and color. New York: William Wood and Company, 1915.

In the twenty-three years of its existence this volume has become, and by frequent revision has remained, a standard text-book. In the present edition the work of revision is seen chiefly in the chapter on syphilis of the nervous system, acute anterior poliomyelitis, epidemic cerebrospinal meningitis, and tumors of the brain and cord. Other subjects of recent study are glandular disorders resulting in disturbances of growth and metabolism, and psychoneuroses. The most important of the changes are, of course, those connected with tabes, paresis and the serology of nervous diseases. The serological formulæ found in syphilitic nervous diseases are furnished by Dr. Kaplan of the New-York Neurological Institute. They are the result of 2000 complete examinations. On account of the rapid

changes of opinion as to treatment, the writer has omitted the special chapter on this subject. The space gained in this way has been filled by many new illustrations.

PHYSICAL DIAGNOSIS. By RICHARD C. CABOT, M. D., Assistant Professor of Medicine in Harvard University; Chief of the West Medical Service at the Massachusetts General Hospital. Sixth edition. Revised and enlarged, with six plates and 268 figures in the text. Pp. 521. New York: William Wood & Company, 1915.

On the basis of quality, not quantity, this is the best American work on physical diagnosis. Although in its sixth edition, it has not yet lost one of its most valuable characteristics—its brevity. The section on diseases of the lungs has been thoroughly revised. Chronic bronchitis is relegated to a place of very minor importance on the ground that it is being recognized as chronic pulmonary edema from weak heart action in the majority of cases. The section on diseases of the heart has been rewritten in accordance with the author's classification of heart diseases. This divides cardiovascular disease into four classes: rheumatic, syphilitic, arteriosclerotic, and nephritic. The volume is practical and concise and its information, based upon the writer's wide and careful personal observation, is presented in simple language. The illustrations really illustrate.

A MECHANISTIC VIEW OF WAR AND PEACE. By GEORGE W. CRILE. Edited by AMY F. ROWLAND. Illustrated. 8vo; pp. 104. New York: The Macmillan Company, 1915.

This fascinating little book was written by Dr. Crile during his recent visit to France to take charge of a hospital unit of the American Ambulance. It is a view of war and peace, drawn not by the politician, the sociologist, or the religious teacher, but purely from the viewpoint of the evolutionist, the physiologist, and the philosopher. It sets forth in a most lucid way a picture that many of us have vaguely seen but which has not before been so clearly drawn. To quote the author's own words in closing, it shows that:

"When man comprehends his own mechanism, when he understands the dominating influence of his progenitors and appreciates the infinite possibilities of his training, then he may reach a grade of civilization which will enable him to invigorate himself without ruin. Struggle is a biological necessity, and even war is preferable to pusillanimous peace leading to degeneracy."

"When the mechanistic viewpoint is generally understood, a viewpoint that fixes all responsibility for human action here and now within one's self; that teaches that one generation predetermines the action of the next generation; that the new-born infant is only the plastic clay from which the real man is created—a new meaning will be given to education."

"Man at last may see that his destiny is in his own hands and that there is no active supernatural power that will help or hinder his career; in fact, that his destiny in part has been determined by his evolution, but that the balance is to be man made here and now."

THE MEDICAL RECORD VISITING LIST FOR 1916. Published by William Wood & Company, New York.

This favorite list is issued in red or black morocco binding, with or without dates, and arranged for thirty, sixty, or ninety patients a week. It is also issued in two books of six months each fitted into seal or calfskin wallets, making the most elegant list offered to the medical profession. The price ranges from \$1.25 for the regular list for thirty patients a week to \$4.00 for the special sealskin wallet and list for sixty patients a week. Besides the visiting list with special memoranda and records of obstetric practice and engagements, vaccinations, deaths, addresses, cash account and so on, it contains tables of the maximum adult doses by the mouth in apothecaries and decimal measures, drops in a fluidram, solutions for subcutaneous injection and for atomization and inhalation, duration of pregnancy, approximate equivalents, emergencies, surgical antisepsis and disinfection.

THE PHYSICIAN'S VISITING LIST FOR 1916. Published by P. Blakiston's Son and Company, Philadelphia.

This well-known list is issued for from twenty-five to one hundred patients a week dated in a perpetual edition for thirteen hundred or twenty-six hundred names, and in a monthly edition so that the whole month's account can be kept in one place. Prices run from \$1.25 to \$2.50. It has the usual list with special memoranda, addresses, vaccinations, births, deaths, cash account, tables of incompatibility, treatment of poisoning, weights and measures, dose table, emergency treatment of asphyxia and apnea, and so on.

POTTER'S COMPEND OF HUMAN ANATOMY. Revised by D. GREGG METHENY, M. D., L. R. C. P. AND S. (Edin.), L. F. P. S. (Glasgow), Associate in Anatomy, Jefferson Medical College, Philadelphia. Eighth edition. Pp. 428, with 139 illustrations; also numerous tables and sixteen plates of the arteries and nerves. Philadelphia: P. Blakiston's Son & Co., 1915.

Although this edition has been entirely rewritten by the reviser, it follows the general lines of its predecessors, being devoted to the absolute essentials of gross anatomy. The nomenclature of the German Anatomical Society is included, in the Latin form, but only such of the B. N. A. terms as seem entitled to survive are given in the English form in preference to the older regular terms. Although the volume consists of over 400 pages, it is small enough for the pocket.

WHAT EVERY MOTHER SHOULD KNOW ABOUT HER INFANTS AND YOUNG CHILDREN. By CHARLES GILMORE KERLEY, M. D., Professor of Diseases of Children, N. Y. Polyclinic Medical School and Hospital. Pp. 107. New York: Paul B. Hoeber, 1915.

A most valuable little work which is exactly what it purports to be. It tells in simple, direct language all that every mother should know about her young children and nothing which she should not

know. Its advice is sound. It does not attempt to teach therapeutics. The directions for infant feeding are based upon the use of top-milk. The only possible criticism is that the book, which actually contains only 54 printed pages, is padded to double the necessary size by printing upon only one side of each page for the ostensible purpose of allowing note making. The book is too good to be improved by any maternal additions.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS

Infundibulin in Primary Uterine Inertia and in Induction of Labor.—W. B. Bell (*Proc. Roy. Soc. Med.*, 1915, viii, *Obst. and Gyn. Sect.*, 71) says that primary uterine inertia is usually due to deficiency or absence of the normal stimulators of uterine contractions, that is to say, of the hormones, such as infundibulin, and of the compounds of calcium. By a judicious use of these substances we should be able to deal with any case of so-called "idiopathic" primary inertia. In a case which had had several instrumental labors the writer noticed as the patient lay on her back, that the outlines of the uterus could not be observed: the abdomen was flat, and it bulged at the sides as though it contained free fluid. The child was easily palpable, but it was impossible to stimulate contractions in the uterus by manipulation. The blood pressure was only equal to that of 95 mm. of mercury. The blood calcium index was only 0.3. Under these circumstances he made a diagnosis of primary uterine inertia. He ordered calcium lactate, and infundibulin by mouth. At the end of fourteen days the calcium index in the blood had gone up to 0.56 and the blood pressure to that of 110 mm. Hg. The uterus showed more irritability and had a definite outline. This treatment was continued. Two days after the calculated time for the onset of labor bougies were introduced. Labor, which began in eleven and a half hours proceeded normally and was completed within seven and a half hours.

Infant Mortality due to Labor.—C. S. Bacon (*Jour. A. M. A.*, 1915, lxiv, 2048) calls special attention to pathologic uterine contractions as a cause of intrapartum infant mortality. So long as the contractions last only a short time and are separated by considerable intervals of relaxation, there is no appreciable disturbance to the fetus. If the contractions last more than one and one-half minutes, and if the intervals between contractions are shorter than the contractions themselves, the condition is pathologic and dangerous. Such excessive contractions may occur early in labor, but they generally come on later. They are often the reaction of the uterus to obstacles to delivery and so occur in contracted pelvis, bad presentations, etc. They are excited by operative interference. It is very important, therefore, to watch the uterine contractions with

great care in long and hard labors, and especially toward the end of labor, when excessive contractions are more apt to occur. The diagnosis of the condition of the fetus is made by counting the fetal heart tones. Whenever there is danger, the heart tones should be counted every ten to twenty minutes. The management of excessive contractions to prevent fetal death is to control the contractions. The best means is the hypodermic injection of morphine, and anesthesia. One-fourth grain of morphine is generally sufficient in the first stage of labor. If necessary, this dose could be repeated, for at this time there is not very much danger of morphine affecting the child. In the second stage, ether may well be combined with morphine, or substituted for it. Should the obstacle to delivery that excites the excessive uterine contractions be at the obstetric outlet, that is, should the head be on the perineum and held back by a tense unyielding vulvar ring, episiotomy should be done. If the head is not at the vulva but down in the pelvis, and the cervix is well dilated, and if, in spite of morphine and anesthesia, the danger to the child is great, forceps may be applied. As a rule, however, forceps will increase the danger of fetal asphyxiation and should not be used unless an easy and quick extraction is possible. There is a great difference in the danger of high forceps and low forceps. The former has been used far too much in contracted pelvises. Cesarean section or hebstomy is in proper cases to be chosen, while the induction of premature labor must be considered in cases seen early enough in pregnancy. The high forceps is an operation that is very nearly discredited.

Pregnancy in the Rudimentary Horn of a Uterus Bicornis.—Francesco Maceabruni (*Ann. di ost. e gin.*, Aug., 1915) gives the history of an interesting case of pregnancy in the rudimentary horn of a uterus bicornis, in which the operation for a supposed extra-uterine pregnancy showed a ruptured uterine horn. The removal of the fetus of four months and the rudimentary horn of the uterus was followed by recovery. The specimen removed was studied microscopically with a view to ascertaining what changes took place during pregnancy. The conclusions as a result of this examination are these: in the rudimentary pregnant horn were seen special elements which appeared to be fibrocells of a new formation among the muscular elements. The endothelium of the blood-vessels had taken on a decidual reaction. There was a direct communication between the maternal blood-vessels and the intervillous spaces. The unstriped muscle fibers assisted in the formation of the decidua. In the rupture of such a horn, mechanical factors are primarily responsible, the villous infiltration secondarily. The diagnosis of pregnancy in a rudimentary horn of a bicornate uterus is not easy, and the data generally given to assist in such a diagnosis are useless.

Origin of the Stimulus of the Mammary Secretion.—Pedro Zuloaga (*Arch. mens. d'obst. et de gyn.*, Sept. 15, 1915) cites various researches as to the nature of the stimulus which causes mammary secretion. The question arises whether it comes from the fetus, the placenta, the ovum, the corpora lutea, the maternal uterus, or

the myometrial glands. The author gives histories of three cases in point. He then summarizes the results of his personal researches and historical material thus: The crisenogenous hormone which causes milk secretion must be secreted by the myometrial gland. The internal secretion of the myometrial gland goes during pregnancy to the placenta and fetus, causing in them the genital crisis of the new-born described by Bar. The fetus exercises no effect in causing secretion. It is only after the rupture of the direct relations between the placenta and the uterus that the product of secretion of the myometrial gland passes into the maternal blood, thus causing the stimulus of mammary secretion. Uterine involution favors the passage of the crisenogenous hormone into the maternal blood. In the fetus, in the placenta, in the uterine tissue are found, in larger or smaller quantity, crisenogenous hormones sufficient to determine mammary secretion. This fact explains the results obtained by some authors with the extract of the uterus, placenta, or fetus on the mammary gland.

On the Histology of the Uterine Mucosa with Reference to the Presence of Lipoids.—Aschheim (*Zeitschr. f. Geburtsh. u. Gynäk.*, Vol. lxxvii, Hft. 2) presents the results of a large series of observations in the Charité at Berlin. He has studied the lipoids without reference to their composition, based on their staining properties. These are found in the epithelium, stroma, and in the lumen, either as fat droplets of various sizes or as cells with fatty nuclei. It would appear that the presence of lipoids in large quantities in the child-bearing age can usually be demonstrated in the premenstrual stage and likewise that the mucous membrane before and during menstruation contains numerous lipoid bodies in the epithelial cells. As the period continues they disappear from the epithelium and during the intervals only a few fat granules can be found. The author believes that this lipoid substance must not be regarded as evidence of degeneration but rather as vitamines, that is to say, as substances without the presence of which life cannot exist nor growth continue.

Case of Cervical Implantation of the Placenta.—Tiegel (*Zeitschr. f. Geburtsh. u. Gynäk.*, vol. lxxvii, Hft. 2) reports an instance of this kind in a multipara, thirty-six years of age in which the ovum produced a destruction of the entire wall of the cervix, the lower border extending within 1 cm., of the external os. The uterine cavity itself was not involved. As the result of this unfavorable implantation severe hemorrhages resulted at the end of the second month of the pregnancy, which treated for a considerable time with packing, resulted in an infection of this area with a subsequent purulent thrombophlebitis. Notwithstanding the admission of the patient to the hospital where the decomposing material was removed and the uterus extirpated by the abdominal route the patient died seventeen days later with evidences of a progressive pyemia. An examination of the specimen showed that the mucous membrane of the body of the uterus did not contain any pregnancy changes. Such cases can only be treated by radical extirpation of the uterus, tamponade being extremely dangerous as shown in the present case.

Malignant Uterine Myoma.—Lahm (*Zeitschr. f. Geburtsh. u. Gynäk.*, vol. lxxvii, Hft. 2) reports the case of a nullipara sixty-one years of age in whom an abdominal total hysterectomy had been done on account of an irregular bleeding from a uterus enlarged to the size of a head. Examination of the tumor showed a myoma which in its growth and distribution as well as in its histological composition must be regarded as malignant. The sarcoma-like changes were present in the intercellular substance as well as in the cells themselves, in the latter being present as an increase in the chromatin substance of the nuclei. The tumor had grown along the spermatic veins of the broad ligament as well as in the lymphatics of the uterine wall.

Energy Measurements in Pregnancy, Labor and the Puerperium.—Bigler (*Zeitschr. f. Geburtsh. u. Gynäk.*, vol. lxxvii, Hft. 2) has made a comparative series of observations with Christen's ergometer at the end of pregnancy and in nonpregnant individuals and found that the volume and tension of the peripheral pulse at the end of pregnancy was considerably reduced below the normal. He believes that this is due to the fact that at this time a considerable amount of blood is withdrawn from the peripheral vessels into the uterus. During labor a considerable increase in the peripheral effect of the heart action results, which attains its maximum during the period of expulsion. This does not bear any relation, however, to the total energy exerted by the heart. The over filling of the splanchnic vessels after labor brings about a marked depression of the peripheral fullness of the pulse which is continued during the puerperium. The author demonstrates these observations by a series of pulse diagrams.

The Influence of the Ovary on the Growth of the Uterus.—A. Mayer (*Zeitschr. f. Geburtsh. u. Gynäk.*, vol. lxxvii, Hft. 2) discusses this subject with reference to fetal life and early childhood. The growth of the uterus may be summed up in five characteristic periods. The first is the embryonal or fetal phase including intra-uterine development of the uterus up to the time of birth, second the period from birth to the beginning of puberty, third development during puberty, fourth development during pregnancy and fifth retrogression after the menopause. The latter is acknowledged to be due to a loss of ovarian function. The enormous growth of the uterus during pregnancy cannot be clearly ascribed to any ovarian activity. Although impregnation cannot take place without an ovum or a corpus luteum it is questionable whether the influence of the ovary extends to the progressive uterine growth after impregnation has taken place. It is well known that the germinative act of ovarian function, which is comprised in the ripening of the follicles, ceases during pregnancy in the human subject. The internal secretory activity of the ovary during pregnancy is however subject to question and pathological disturbances of these internal secretions have been assumed to be the cause of ovarian diseases of pregnancy including hydatid mole, eclampsia and hyperemesis. Undoubtedly the activity of the ovary is not entirely suppressed during pregnancy as is shown by those cases in which the uterus has continued to grow

with its contained pregnancy after double castration in the early months of the process. During puberty the development of the uterus undoubtedly depends on that of the ovary. Its effect on the uterine growth during fetal life and childhood is taken up by Mayer in the present article and the results are presented of observations made in guinea pigs and dogs. As the result of these experiments, which must be referred to in the original article, it appears that the growth of the uterus during fetal life and in childhood up to the time of puberty is not exclusively dependent on the ovary. In castrated animals subject to an exploratory laparotomy at the end of a year no difference could be detected in the uterus either anatomically or histologically.

Functional Kidney Tests in Pregnancy.—Orlovius (*Zeitschr. f. Geburtsh. u. Gynäk.*, vol. lxxvii, Hft. 2) discusses this subject with particular reference to the question of inducing abortion. Nineteen cases were studied with reference to the creatinin excretion, including nonpregnant and pregnant women without evident kidney disturbances. In another series in which these were present the author believes that the elimination quotients constitute valuable factors in determining the prognosis of a given case, especially if combined with accurate clinical observation. He claims that where the clinical symptoms in a case of nephritis during pregnancy are doubtful the process need only be interrupted if the functional tests are positive and if no improvement results in from one to two weeks. The test he employs for this purpose is that devised by Neubauer in which creatinin, 1.05 grams dissolved in 200 c.c. of sugar water is given by mouth in the early morning and the urine examined at six-hour intervals according to Folin's method, using the colorimeter of Autenrieth. The procedure as described does not bear abstracting but is claimed by the author to be simple enough to be done in any laboratory.

GYNECOLOGY AND ABDOMINAL SURGERY.

Alexander-Adams Operation and Its Results.—D. G. Madill (*Jour. Obst. and Gyn.*, Brit. Emp., 1915, xxvii, 49) says that the Alexander-Adams operation is indicated in cases of simple, nonadherent retroversions giving rise to symptoms, with the exception of those whose complaint is sterility. The technic is simple, and if reasonable care be taken, the ligaments are easily found. The operation ought to be free from subsequent complications, and there should be no mortality. Of forty-seven of the writer's cases operated on over two years ago over 85 per cent. were cured of menorrhagia and metrorrhagia, and over 75 per cent. of intermenstrual pain. There is no trouble during pregnancy, and evidence tends to show that the uterus remains in good position after delivery.

So-called True Hermaphroditism.—W. B. Bell (*Proc. Roy. Soc. Med.*, 1915, viii, *Obst. and Gyn. Sect.*, 77) lays down the following as essential conditions which must be established before any case can be considered one of glandular partial hermaphroditism: (1) The

hermaphroditic gonad must be an ovo-testis, composed of ovarian tissue with definite primordial ova, Graafian follicles or corpora albicantia, surrounding a central portion containing seminal tubules and testicular interstitial cells. (2) The subject must show in the primary or secondary characteristics, other than the sex glands, evidences of hermaphroditism. If these conditions be considered critical very few cases, probably only three (von Salen's, Garré's, and Blacker's and Lawrence's), apart from one reported by the writer, would pass the test. The author's patient commenced life and passed puberty as a normal girl, menstruating regularly for eighteen months; menstruation then ceased and masculine characteristics developed, and in spite of this she suffered from menopausal symptoms after operation. Nine months after bilateral castration the moustache had fallen out, all the hair on the legs had vanished, the voice was less deep, the skin less coarse, and her figure generally was much more feminine in regard to plumpness and outline. After the masculine characteristics developed an exploratory laparotomy was performed at the age of nineteen and a section was removed from each genital gland. The pathologist, reported columnar-celled carcinoma of the left ovary. For this reason both genital glands were removed. The histological details of the left genital gland are claimed by the writer to fulfill the essential requirements for the diagnosis of glandular partial hermaphroditism.

Character, Significance, and Prognostic Value of Peritoneal Exudates.—The results of an investigation by R. B. Carslaw (*Brit. Jour. Surg.*, 1915, iii, 8) are based on an examination of eighteen cases of appendicitis, four cases of perforated gastric or duodenal ulcer, one of tuboovarian abscess, and one of femoral hernia, operated on by him. He recognizes in the exudate the following cells: (1) Endothelial cells; (2) large hyaline mononuclear leukocytes; (3) polymorphonuclear leukocytes with fine neutrophil granules; polymorphonuclear leukocytes with coarse eosinophil granules; (4) lymphocytes. Mast cells with granules showing metachromatic staining, and red blood corpuscles, were also identified. The "mononuclear phagocytes" in the peritoneal exudate consist of two different types of cells, endothelial cells and large mononuclear leukocytes, which not only have two distinct sources of origin, but also can easily be distinguished from each other in all stages of their functional activity by the "indophenol-synthesis" test for oxydase. Examination of the peritoneal exudate is of great prognostic value in cases of spreading peritonitis, as it indicates the amount and virulence of the bacterial invasion and the extent to which the reactive forces of the peritoneal cavity have been, or are being, developed. In considering the significance of the relative number of the various cells, their phagocytic activity, and their healthy or degenerated character, the duration of the bacterial invasion must always be borne in mind. The contention that an immediate examination of the exudate in cases of spreading peritonitis supplies information which indicates whether drainage of the peritoneal cavity is necessary or whether primary closure may be employed,

must be modified by three facts, viz., (a) Local drainage is very often necessary although drainage of the general peritoneal cavity may be not only unnecessary but also injudicious; (b) Drainage of the general peritoneal cavity is only called for in *very* exceptional cases; (c) Effective drainage of the general peritoneal cavity is impossible.

Paget's Disease of the Nipple and Allied Conditions.—J. H. Jopson and J. Speese (*Annals Surg.*, 1915, lxii, 212) present a study of six cases. They say that Paget's disease of the nipple is a primary affection beginning in the cells of the rete Malpighii, potentially malignant, although lacking the ordinary characteristics of malignant disease. It is identical with the disease known under the name of Paget occurring in other regions. It is commonly, although not invariably, followed by glandular carcinoma in the underlying breast tissue. It is precancerous in the sense that it induces epithelial changes in the superficial milk ducts and acini, which are followed by carcinoma. Occasionally, although rarely, it is followed by squamous-cell carcinoma of the nipple. The disease is characterized by edema and vacuolization of the prickle cells, thickening of the rete, and active mitosis, also by an inflammatory reaction in the corium and a secondary hyperplasia in the milk ducts. It is sharply differentiated from true eczema and scirrhus carcinoma ulcerating at the nipple, and should not be confused with superficial metastases of diffuse cancer situated near the skin. The resulting tumors of the breast and the regional metastases resemble the type of breast cancer usually encountered. When the tumor originates in the skin, it infiltrates and metastasizes in the form of squamous carcinoma. The common association of cancer in the breast with Paget's disease demands as the treatment for Paget's disease, the radical operation which is practised in breast cancers in general.

Physiological and Pathological Results of Direct Abdominal Hysteropexy.—M. Muret (*Ann. de gyn. et d'obst.*, July-Aug., 1915) says that uterine ventrofixation opens up a new physiology of the organ, which varies according to the method used, the degree of fixation, and the nature of the cicatrix. The fixation may be more or less high; the mobility of the uterus may be preserved or altered; its position more or less changed. All these changes have an influence on the life of the organ. In case of later pregnancy these factors may give rise to serious accidents. When the uterus is attached by a moderately firm fixation to the abdominal walls, not too high up the uterus takes up a nearly normal position with good mobility; but when fixed by its fundus or upper portion high up on the abdominal walls, and when the cicatrix is large and firm, the position is different. It becomes an integral part of the abdominal walls, has no independent mobility, and partakes of their movements. Intraabdominal pressure cannot act except on the posterior face of the uterus. When the uterus is heavy and not well sustained by a firm perineum and the vagina remains prolapsed the uterus drags on the abdominal wall. If the abdominal walls are distended

or there is a ventral hernia, every effort causes the wall to be pushed forward and the abdomen to become prominent. In standing the walls are prominent while in recumbency the position is natural. The uterus is higher up when standing than when lying down. To do a hysteropexy without a perineorrhaphy and replacement of the vagina is a very grave mistake. The culdesac of Douglas is large and the intestines are gradually pushed down into it, the resulting posterior enterocele may be of large size. In old or sterilized women the author operates so as to fix the uterus broadly to the abdomen high up, with a firm perineum and a vagina that is reduced in width. The uterus is then applied firmly by abdominal pressure to the abdominal wall and the bladder, and there is no space into which the intestines can fall in front of the uterus; the formation of anterior bands which can catch the intestines is prevented. In young women in full sexual life hysteropexy should be low, narrow and superficial. There forms a median ligament which unites the uterus to the abdominal wall below the tissues of round ligaments. Here the uterus takes a nearly normal position and remains close to the bladder, leaving no space for the intestines to prolapse. No anterior pouch is formed. In 250 ventrofixations the author has seen no cases of intestinal prolapse.

Limitations of the Radical Operation for Cervical Cancer of the Uterus.—H. T. Hutchins (*Bost. Med. and Surg. Jour.*, 1915, clxxiii, 97) urges conservative radicalism in border-line cases. If doubt exists as to whether a case is operable or not, always open the abdomen and find out, thus giving every case the full benefit of the doubt. The operability can be determined immediately the abdomen is opened. If the base of the bladder is involved, if the rectum is involved, if the carcinoma extends laterally to the wall of the pelvis and surrounds the ureter, and if the iliac glands are involved, only a minimum of these cases will be cured by radical operation and a large number will be left in a hopeless condition. In such cases we shall better serve our patients by not attempting the radical operation. A resection of the bladder, a transplantation of the ureters, or a resection of the rectum *without* the complete removal of every vestige of cancer, are unjustifiable procedures. Providing after the abdomen is opened the case is found too far advanced for a clean radical operation, both internal iliacs should be tied and the abdomen closed. This will help to relieve the bleeding and in some measure delay the spread of the growth. The cervix should then be attacked with the slow cautery, following Percy's method.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

HEMORRHAGES IN CHILDREN.*

BY

H. BROOKER MILLS, M. D.,

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THERE is perhaps nothing that will alarm parents more than the appearance of bleeding in a child. Neither the quantity nor the source of the blood are considered; the mere fact that it is blood suffices to throw them into a state bordering on insanity and the pediatricist's presence is never more urgently demanded. In the majority of instances the bleeding should not be labeled hemorrhage as it is much more likely to be a slight oozing, traumatic and probably local in origin, rather than a true hemorrhage or a frank hemorrhagic disease. While it is true that in the new-born various diatheses, which have hemorrhage as a symptom, may be present, such for example as Buhl's disease, Winckel's disease, syphilis and melena neonatorum, it is not by any means common for hemorrhages to occur during childhood, especially if those due to purpura, scurvy and trauma be excluded.

Buhl's disease may occur in an infant apparently healthy, the symptoms being vomiting, cyanosis, jaundice and hemorrhages. It is very fatal, and at autopsy multiple hemorrhages and fatty degeneration of all the viscera will be found. Neither omphalitis nor hemophilia are believed to be the etiologic factors. The only treatment is symptomatic.

The only important differences between Buhl's disease and Winckel's disease are that Winckel's disease seems to be epidemic in character and to have more hemorrhage and less fatty changes, which may explain its greater mortality and more sudden death. Treatment is symptomatic.

In many cases of hemorrhage due to congenital syphilis, gross evidence of syphilis is not present, the only symptoms being cyanosis, edema and icterus, the hemorrhages themselves consisting of a capil-

* Read before the North Branch of the Phila. Co. Med. Soc., Oct. 25, 1915.

lary oozing from the umbilicus, nose, bowels and other organs. If syphilis be suspected, the treatment of course should include mercurials in the form of gray powder or calomel, gr. i of either per twenty-four hours to a child six months old. In some cases calcium chloride in the same dose has seemed to be of benefit.

Melena neonatorum is a condition that usually alarms the new mother, because she feels a baby of two weeks or less has not the vitality to stand what to her seems like a great loss of blood. It is a grave condition, fully one-half the cases dying. Unfortunately we have scarcely any remedy of much avail. Perhaps the best form of treatment is that of Welch of N. Y., which consists in the injection, under the skin of the infant, of at least 3i of human serum which has been obtained under aseptic precautions. One or two injections are claimed usually to be sufficient but I have had no personal experience in the use of this remedy.

Where the blood seems to be coming from somewhere in the gastrointestinal tract make sure it is not being swallowed while nursing from fissured nipples. In the same way where blood is coming from the mouth, before thinking of possible gastric or pulmonary origin make a careful examination of the mouth, some slight trauma there being by far the most likely source. In 1899 I reported a case of umbilical hemorrhage in a small child five days old, the bleeding being stopped by pressure. In 1900 I reported a case of vaginal hemorrhage, sometimes called pseudomenstruation, occurring also at about the fifth day, the patient being a sister of the child which suffered from umbilical hemorrhage. Being able to fairly well assure myself of the absence of hemophilia and syphilis as etiologic factors, and finding undoubted evidence in the urine of the two patients and in the clinical history of the parents, of a lithemic diathesis, it seemed probable that this at least in part explained the condition. I would be glad to know if others have observed similar clinical and laboratory findings in hemorrhage of the new-born.

The occurrence of bleeding as a symptom of scorbutus is well known. It is not an early manifestation, however, nor is it one that requires any treatment other than that for the general condition.

Another cause of bleeding which is fairly common in childhood is purpura, manifesting itself largely as petechial hemorrhages beneath the skin and mucous membranes. In this respect it sometimes closely resembles the bleeding in scorbutus, but the joint involvements and history of imperfect feeding in the latter case will usually make the diagnosis. If not, the prompt improvement of the scorbutic child upon the administration of fruit juices and the institution of proper dietary

changes will leave no doubt of the diagnosis. In the vast majority of cases purpura is but a symptom of a toxemia, such for example as would follow the infectious fevers and the administration of large doses of such drugs as phosphorus and antipyrin. The treatment primarily is that of the probable etiologic factor but, in addition, much may be done for the bleeding itself. Calcium chloride has been quite beneficial in the hands of many while several speak in glowing terms of the use of adrenalin solution (1-1000). Here, however, as in other cases of obscure or hidden hemorrhages, the human blood-serum treatment of Welch, using as high as 3 ii to 3 iv daily if necessary, seems to give the most prompt relief.

Just a word will suffice to cover the question of hemorrhage in typhoid fever in children as it is an extremely rare condition. Should it occur in a child of six years, Dover's powder in 2- or 3-grain doses or morphine gr. $\frac{1}{30}$ by hypo would be indicated, withholding food but giving water and ice freely. Hematemesis or vomiting of blood is another rare condition of childhood and when present is invariably due to ulceration of the stomach. This in turn may be congenital, or tubercular or due to some devitalizing disease from which the child may have suffered, such as acute infectious fever. Dark, tarry stools are usually present. The treatment consists of putting the stomach at absolute rest by using rectal feeding, to which stimulants or sedatives may be added as required. The various bismuth preparations and silver have proved beneficial and much benefit has been claimed for suprarenal extract in gr. i doses hourly until vomiting ceases. Opium in some form may be necessary to insure absolute quiet. Ice-bag over epigastrium and small pieces of ice internally may be used.

Hemoptysis is also so rare in children that it requires no consideration at our hands.

Hematuria is comparatively common in childhood but rarely occurs as a disease *per se*. It is usually a symptom, complication or sequel of some other condition, as for example, scurvy, scarlatina and purpura, the treatment of which is all that is necessary.

I might mention hemophilia—a disease, as you know, of males, but transmitted by females. Its etiology is unknown, except as to heredity, occurs at all ages, the first-born child is likely to be exempt and all parts of the body are affected. No specific treatment has yet been found.

In closing let me urge serum or vaccine therapy, including diphtheria antitoxin when obtainable, as the treatment of choice in all cases of hemorrhage.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

Section on Pediatrics.

Meeting of October 14, 1915.

WALTER LESTER CARR, M. D., *in the Chair.*

HYPERTROPHIC PULMONARY ARTHROPATHY IN A GIRL OF ELEVEN YEARS.

DR. CHARLES HERRMAN presented this patient, a girl eleven and one-half years of age. So far as was known there was no tuberculosis or syphilis in the family. The parents have been married twenty-two years and have had eight children, the eldest, twenty-one years of age was married and had two healthy children. There had been no deaths and the mother had had no miscarriages or stillbirths. None of the other children have any symptoms pointing to tuberculosis of the lungs, bones or lymph nodes. This patient has always been weaker than the other children. She was breast-fed for one year, began to walk at one and one-half years and had measles when two years old. When she was seven years old the mother noticed that she held her head to one side. When the patient was eight years of age, in 1912, the spinal curvature became more distinct and she was operated on by Dr. Whitman at the Hospital for Ruptured and Crippled. During the past four years she has lost weight, has a cough worse at night, but no sweats. The enlargement of the ends of the fingers began about seven months ago, that of the knees and ankles about four months ago. There has been occasional slight pain in the knees, ankles and fingers.

The patient was admitted to the Lebanon Hospital September 1, 1915, at which time she weighed 49 pounds, was poorly nourished, had marked spinal curvature and pronounced deformity of the chest. There was dyspnea which became more pronounced after slight exertion. Because of the chest deformity examination of the lungs was difficult. The heart sounds were normal. There were rales in the axillary line and over both bases posteriorly. The patient complained of pain on both sides of the chest, more intense on coughing or deep inspiration. There was a small quantity of mucopurulent expectoration; large quantities were never present; it was never foul-smelling and on examination failed to show the presence of the tubercle bacillus. The cutaneous reaction, however, was positive. There was distinct atrophy of the muscles of the upper arm, the hands were cold, but not cyanotic, the ends

of the fingers and toes were clubbed. The circumference of the knee- and ankle-joints were increased and there was some atrophy of the muscles of the leg. The patient's temperature ranged between 99 and 101.2° F. The urine contained a small amount of albumin but no casts. During her stay in the hospital the patient gained 1 pound.

Dr. Herrman exhibited radiograms of the hands showing in the metacarpal bones a thin layer of new-formed bone under the periosteum and a similar but less distinct layer in the first phalanges. Similar changes were shown in the bones of the foot. The radiograms of the knee showed layers of new-formed bone over the upper end of the tibia. The joint itself presented no changes.

About 100 typical cases of hypertrophic pulmonary osteoarthropathy have been reported, but of these only seven were in children. In adults the condition occurred five times as often in males as in females, and most of the patients were between twenty and forty years of age. Some form of chronic disease of the lungs was present in 75 per cent. of the cases, the most frequent lesion being bronchiectasis; the next in frequency was chronic pulmonary tuberculosis and empyema. One of the most plausible explanations as to the cause of the changes in the bones and the tissues surrounding the joints was that the imperfect function of the lungs caused a lack of proper elimination of toxic substances, these being absorbed into the circulation and affecting chiefly the distal parts where the circulation is slowest. The condition was occasionally seen in diseases of the liver, where the disturbed function of the organ caused imperfect elimination. The characteristic feature of the condition was the deposit of a thin layer of new bone under the periosteum of certain bones. This was shown most distinctly in radiograms, usually most marked over the lower end of the radius and ulna. It begins a few inches above the end of the bone and extended down to the epiphyseal line. It was also seen on the metacarpal bones and the first phalanges, on the lower end of the tibia and fibula and on the metatarsal bones and first phalanges of the foot, less frequently on the lower end of the humerus, upper end of the radius and ulna and occasionally on the clavicle, ribs, and iliac crest. The enlargement of the joints was due to hypertrophy of the soft parts, there being no marked change in the cartilage, no redness, no suppuration, and rarely severe pain. The clubbing of the fingers was also due to hypertrophy of the soft tissues covering the terminal phalanges, not to any change in the bone itself. In extreme cases the nails become convex and curled at the end, and had aptly been described as parrot-beaked.

DISCUSSION.

DR. HENRY W. BERG asked Dr. Herrman whether the patient had had a Wassermann reaction taken and whether it was negative or positive. He said he was glad the Section had seen the child as he did not remember having seen more than two such cases.

He did not know that there was such a large number of cases reported as Dr. Herrman had stated. As to the pathological lesions in the two cases coming under his observation, the one was a spinal arthropathy somewhat similar to those of locomotor ataxia. The x-ray did not show a bone disease process. Both of the cases were neurological. The rapid collapse of the spine through destruction of the bodies of the vertebræ was not what one usually saw in Pott's disease wherever it might occur, in the cervical, dorsal or lumbar region, but was rather suggestive of the possibility of specific disease, the possibility, not the probability of specific disease. The slight amount of paralysis indicated that the collapse of the spine had occurred so suddenly as to cause compression of the cord.

Dr. Berg said he hoped Dr. Herrman would publish his case so that it could be studied at leisure.

DR. HERRMAN, in reply to Dr. Berg's question as to whether the Wassermann had been taken, said that the Wassermann test was made and was negative; the von Pirquet, however, was positive. The heart was negative. The signs in the chest were in the axillary line and at the bases of the lungs. The lungs had been fluoroscoped, but on account of the marked deformity of the chest one could not state definitely that tuberculosis was present. The mother had had no miscarriages and no stillbirths and while this might not positively exclude syphilis it carried some weight. There were no signs of specific disease in the other children and besides there was positive evidence of tuberculous infection and it was known that chronic pulmonary tuberculosis was very frequently present in the history of this condition.

A CASE OF MENINGITIS WITH COMPLETE RECOVERY.

DR. W. MORGAN HARTSHORN presented a child two and one-half years old admitted to Roosevelt Hospital with symptoms of meningitis. The mother had had twelve children and no miscarriages. When six months of age the child had pertussis and the cough persisted for a considerable length of time. The appetite was good, however, and the bowels regular. The child was breast-fed until fourteen months of age. The child's present illness began with the vomiting of green watery fluid, spasms and then general convulsive movements. Three days later there were four or five more spasms and from this time until the child was admitted to the hospital the spasms continued. At the time of admission to the hospital the child was fairly well nourished, unconscious, with staring eyes and the right pupil larger than the left. There were furuncles on the knees and pustules on the gluteal region; these were covered with a thick crust in some places. The heart was rapid and crepitant rales were heard in the chest. There was slight opisthotonos, but no Kernig, Babinski, Oppenheim or ankle clonus. A diagnosis was made of meningitis complicated by bronchial pneumonia. The child's temperature ranged during the first week between 100 and 104 and the pulse between 96 and

120. A lumbar puncture was performed and $\frac{1}{2}$ c.c. of cloudy fluid withdrawn. Examination of the fluid showed that the majority of the cells were lymphocytes, which was unusual and very puzzling. The child remained in an unconscious condition. During the second week the temperature ranged from 101 to 106° F. and the pulse from 120 to 140 or 150. Very little spinal fluid was obtained by puncture, about 3 c.c. on one occasion, but it was still purulent. On another occasion 15 c.c. of spinal fluid was withdrawn. The child's pulse grew weaker and its condition was considered hopeless. They were undecided whether they had a primary meningitis or a meningitis following bronchopneumonia. During the third week the temperature continued high, running from 100 to 103° F., the pulse from 99 to 145 and respirations from 40 to 50. At this time they obtained 25 c.c. of clear fluid. They had given very little medication up to this time. Except a few doses of bromides, and at the time the child was refusing to take nourishment, some whiskey. They had also given some urotropin. The temperature then began to come down, but the child was extremely irritable and still unconscious. However, temperature continued to fall and the child began to take nourishment and to show some signs of intelligence. The irritability and the opisthotonos gradually disappeared, the eye-grounds became normal and the patient went on to recovery, being discharged in good condition.

CASE OF CHILD SWALLOWING A FOREIGN BODY.

DR. HARTSHORN also presented a child, eighteen months old, that had swallowed a safety pin on July 26. The child was rushed to the hospital and radiographs taken but they were unable to find the safety pin. The child was irritable for ten days or two weeks and had diarrhea. The child was then discharged from the hospital and nothing more was heard from it until October 15 nearly three months later when the mother reported that the child had passed the safety pin.

DISCUSSION.

DR. L. E. LAFÉTRA said that cases of epidemic meningitis even in small children frequently recover without treatment. He said he recollected such a case, fourteen months old, at the Vanderbilt Clinic ten years ago, in which thick pus was withdrawn and complete recovery had taken place. In the case just reported the findings were rather peculiar in that when they withdrew "pus" the majority of the cells were said to be lymphocytes and he did not wonder that one would feel puzzled by that finding, but the high temperature and the blood count would indicate the case to have been one of meningococcus meningitis.

Dr. LaFétra said it was his custom to administer the antimeningitis serum whenever he found a cloudy spinal fluid without waiting for the complete examination. Some went on the theory that an amount of serum should be injected equal in volume to the

spinal fluid withdrawn. One should make it a rule never to inject more serum than the amount of spinal fluid withdrawn. A house surgeon in his enthusiasm might inject 20 c.c. for the first dose and follow it by similar doses, even though less spinal fluid was withdrawn. Such a procedure has been followed by prompt respiratory failure and death. A good rule to follow was not to give of the serum more than two-thirds the volume of spinal fluid withdrawn. It sometimes happened that it was very difficult to withdraw fluid and in such cases it might be necessary to puncture the ventricles and make the injection directly into them.

SCARLATINA: SOME UNUSUAL AND SEVERE TYPES.

DR. HENRY W. BERG said that the ten minutes given to the paper allowed him only to present a schematic arrangement of the types of severe cases of scarlet fever such as one saw in large contagious disease hospitals. The prognosis of the severe types was so serious that the physician was as much interested in the outcome as the parents and so it was of much importance and value to know what the chances of recovery were in these serious cases. The first group of cases which he would consider were the severe toxic cases. These severe toxic cases had certain characteristics and a very uncertain prognosis. There was either an extremely severe eruption, or there might be no eruption except around the neck. There was a very high temperature persistently maintained without any attempt at resolution. The rash was punctate and almost blue. The punctate spots were sometimes almost purple but on compression became white.

These cases must be differentiated from the toxic hemorrhagic cases. These latter never get well while the nonhemorrhagic toxic cases may get well. All the severe toxic cases have cerebral symptoms of a marked kind, resembling meningitis; the patients may be almost comatose but one does not get the Kernig, the Babinski or other physical signs characteristic of meningitis, but we do get coma. Cases of severe toxic scarlatina usually have cerebral symptoms as a part and parcel of the syndrome differentiating them from other severe types of the disease. As far as the kidneys are concerned we may find albumin but rarely casts except in the toxic hemorrhagic cases. Of the cases of the severe toxic type a few have a slight amount of adenitis although usually marked angina and an eruption of the congested punctate type.

There was also a type of severe cases which may be designated the septic type. Physicians frequently confuse this type of severe scarlatina with the toxic type. The septic type is severe scarlatina plus the result of a mixed infection with the pus organisms. These are usually cases with severe throat complications and diphtheritic and septic types of anginas. In the septic cases there is rarely more than one attack of vomiting, whereas in the toxic cases the vomiting is more persistent. In the beginning of the disease in the septic cases there is a high temperature curve. The temperature of septic

scarlatina has practically the features of the temperature curve due to septic infection. One of the most important symptoms is the enlargement of the glands at the angle of the jaw. All the glands in that region may become involved making the French appellation "cou cardinal" quite appropriate. These cases become extremely ill with the angina some of which may be diphtheric, and they invariably show albumin in the urine. The importance of differentiating the septic from the severe toxic type is obvious if only because the cases of the toxic type have a very bad prognosis while in the septic type the prognosis is better. The sepsis may be due to different organisms or combinations of organisms but the streptococcus has been recognized as the chief cause of the sepsis in three-fourths of the cases.

Not all the cases called hemorrhagic scarlatina by clinicians really belonged to the hemorrhagic type of the disease. The true hemorrhagic cases were invariably fatal. The real hemorrhagic cases showed petechial spots and there was hemorrhage from the nose, ears, throat, intestines, kidneys or other organs. The finding of a few petechial spots does not constitute a true hemorrhagic scarlatina. The peliosis rheumatica, accompanying scarlatina might cause such cases to be diagnosed as hemorrhagic scarlatina. The so-called scarlatina complicating burns, surgical injuries and puerperal fever, are in the opinion of the writer none of them scarlatina. In such cases of so-called scarlatina complicating the above-named conditions, the eruption is not typically punctate, the throat symptoms are rarely characteristic, there is not the universal lymph adenitis, and the desquamation is not the characteristic scarlatiniform eruption. Dr. Berg said he considered the scarlatiniform eruption in these cases a punctate erythema, manifesting itself as a symptom of sepsis.

SCARLATINA: MORBIDITY AND CASE FATALITY, BY LOCALITY, SEX, AGE AND SEASON. (BASED ON THE STUDY OF OVER A MILLION CASES.)

DR. HENRY H. DONNALLY, Washington, D. C., said that certain families were more susceptible to scarlet fever than others. Physicians in active practice in contagious hospitals were familiar with this fact. They also knew that certain types of children, those that were fat, flabby, overnourished and pasty, bore the disease badly and that gave rise to the knowledge that here was a variation in individual susceptibility. Could these differences in family and individual susceptibilities account for differences in fatality between different small epidemics of scarlet fever? Would it be found that after all scarlet fever was a pretty uniform disease attacking year in and year out an average number of children of whom an average number could regularly be expected to die in a fairly uniform proportion. A study of these and similar questions by means of board of health statistics had been suggested to the essayist by Dr. Howland. Starting out with all the reportable diseases it was found that scarlet fever was the only one that admitted of such investigation

with any satisfaction because it had been well reported and had undergone little change in method of treatment and also because it could usually be readily diagnosticated. Of course the value of such a study was dependent upon the completeness with which the diseases was reported and they knew that all cases were not reported. Very mild cases were frequently unrecognized and very severe ones died without scarlet fever being given as the cause of death. These two types balanced up more or less so that it as believed that the fatality figures obtained for this study gave an approximately accurate idea of true conditions.

In this study something more than 7,000,000 cases have been collected, but only those were retained where it was believed that approximately all cases and deaths were reported. Among approximately 2,000,000 cases there were 104,500 deaths which gave a case fatality of 5.25 per cent., while the morbidity rate was 3.9; that was about four persons in each 1000 inhabitants had scarlet fever of which one case in twenty died. A study of the statistics of a large number of cities for different periods of time showed that there was a marked difference in the amount of scarlet fever in different localities, that in large cities the disease might be abundant in some parts and slight or absent in others and its fatality was also shown to be much greater in some places than in others. England had more scarlet fever than any other place studied; London had more than twice the amount that Paris had. Since 1892 the mean case fatality of England and Wales was 3.3 per cent. and of the Russian Empire 22.3 per cent. For the past 40 years that of former New York was 12.2 per cent., Brooklyn 11 per cent., Boston 7.2, and Kristiania 9 per cent., while Norway as a whole gave 7.9 per cent.

With reference to the periodicity of scarlet fever, in all the places studied it was found that the disease was practically endemic. The fluctuations in the amount, as evidenced by the annual morbidity rates, followed no rule as regards periodicity. The amount of the disease might be increased for a single year, the previous and succeeding years being below the average, but it was more common to see two, three, or less often four or five years in succession in which the amount of scarlet fever was increased. In other words, an epidemic either subsided slowly during two or three years or might attain a greater height in its second than in its first year. It went slowly or came slowly as compared to measles, for instance in which an epidemic attained its height quickly and subsided equally so. There might be but a single year between epidemics of scarlet fever, or there might be two, three, four, or five or more years between them with low morbidity rates in the interim. A standard for judging the amount of scarlet fever in a given community at a given time was found only in the mean morbidity rate of the community in question.

There had been no striking reduction in the annual morbidity rates anywhere during the periods studied. They fluctuated from year to year within essentially the same limits now as years ago.

The smaller the place the greater were the annual fluctuations in morbidity rates. The amount of scarlet fever showed a tendency to decline in Norway and Philadelphia, while in the Russian Empire and in Montreal the tendency was in the opposite direction. There had been a consistent, general and marked reduction in the case fatality during the past half century and that in the absence of specific treatment. In Kristiania for the past five years the case fatality had ranged from 1 to 2.8 per cent.; between forty and fifty years ago it varied from 8 to 30 per cent. In former New York and Brooklyn it was 20 to 35 per cent. forty years ago while it had lately been around 5 per cent. In contrast to the rule of diminishing case fatality the later case fatality in the Russian Empire has been around 30 per cent., while twenty years ago it was only half this amount. In Australia and New Zealand there had been very low morbidity rates and a case fatality of only 1.5 per cent. The explanation of the lowered case fatality seemed to be that the disease was milder to-day than formerly, though the removal of scarlet fever cases to hospitals had improved the care given them and as hospital patients were usually given diphtheria antitoxin it was quite possible that this might be a factor, because combined scarlet fever and diphtheria had a high case fatality. It was also conceivable that there was an immunity which had been increasing during the 300 years since the disease was first recognized. There is a great variation of virulence in different epidemics.

A study of seasonal influences shows that the height of an epidemic may occur at any season of the year. January and December usually have the maximum number of cases and August and September the smallest. In Paris the maximum number is quite constantly in early summer. Case fatality is highest in the summer months, lowest in the fall.

A study as to the susceptibility of the sexes to scarlet fever shows the number of male cases of scarlet fever bears almost the same ratio to the number of female cases that the number of males bears to the number of females in the entire population. There was, however, a very slightly increased susceptibility of males. During the first five years of life males are more susceptible to the disease, while between five and fifteen years females were distinctly more susceptible. The number of deaths from the disease was both absolutely and relatively greater among males than among females, and furthermore, the mortality rate was consistently higher for males at each period throughout life. Nearly half of all cases of scarlet fever occurred at the ages of three, four, five, six and seven years and are pretty evenly distributed at about 10 per cent. in each of these years. Somewhat over 1 per cent. occur under one year of age. After the age of seven years the susceptibility declines until at fifteen years it is again 1 per cent. Between the ages of three and seven about two children out of every three contract scarlet fever if exposed to it in their homes. Few adults, though exposed become infected with scarlet fever. The disease is most fatal during infancy. Ninety per cent. of the deaths occur under ten

years of age. The death rate drops between ten and fourteen years to 1 per cent.

PREVENTION AND CONTROL OF SCARLET FEVER IN NEW YORK CITY.

DR. S. DANA HUBBARD said that in discussing the "control" of scarlet fever in New York there was no such thing as "controlling" scarlet fever. This statement applied elsewhere, as this disease was always more or less prevalent in New York City and would continue to be so as long as the present methods of control or lack of control continued to exist. The control of scarlet fever had oftentimes presented many peculiar and vexatious problems and especially when, prior to the modification of the regulations, the Department of Health had failed to receive the support of both physicians and infected families. By the time the diagnosis of scarlet fever had been made, in frequent instances, a number of exposures had taken place and particularly was this true when the patient became ill in school or in public conveyances. Frequently it was next to impossible to get both school authorities and street employees to appreciate the necessity for promptly removing and disinfecting such material. This material had been generally tracked about and later taken into homes or places where it was a danger, and this was particularly true in the fly season. Parents and teachers should be taught that a child vomiting suddenly and without apparent reason was a danger; when accompanied by a fever and rash, the doctor should be called and the patient properly isolated and the places occupied during the onset of the disease should be carefully cleaned and disinfected. All persons should be taught that vomited material was very infectious and a danger to the community. The Department of Health for many years appreciated that there was a greater danger from infection early in the onset of the disease and had adopted regulations that were thought to be more rational and less unpleasant than were the regulations of the surrounding communities.

A study of "later" (secondary) cases both in New York and in Chicago had proved that where there was a close regard for regulations of quarantine the fewest number of secondary cases occurred. It was interesting to note that in crowded Manhattan the number of later cases so called were less than in Brooklyn and this was attributed by some to the more cheerful cooperation of the people in Manhattan than was experienced in the homes in Brooklyn. Others contributed it to the fact that there were more children in Brooklyn, but in the Department it was thought to be due to the increase in the population in Brooklyn owing to the opening of the Williamsburg bridge; this was the occasion for a large number of families moving from the East Side to Brooklyn. The study had been made shortly after this event occurred.

Another interesting circumstance was the freedom from scarlet fever of the Italian colonies of the city and this might be due to several conditions; it was thought, however, to be attributed to the

fact that in a mild form of the disease, these families did not consult physicians.

Quarantine, as formerly practised by the Department of Health, did not meet with approval and support, and a modification was made substituting Medical Inspectors by trained nurses who were carefully instructed and trained in the duties of establishing and maintaining quarantine. This change had been highly successful as indicated by the diminishing of the number of complaints against the field force. Formerly it required the services of a clerk in each Borough to attend to these complaints; but since the establishment of this new method very few complaints were received and they were able to discontinue the services of these employees and put them to work at other things. The nurses were instructed to visit and instruct; the efficiency of a nurse was measured by the character of her district as was determined by supervision of the same. The nurse being expected to see that the case was made comfortable, and if necessary all social welfare or up-lift work necessary was to be performed by her, in fact the motto of the Bureau was to leave a case better than it was when found. The changes to nurses had been made by other communities which informed that they had been similarly satisfactorily pleased and no doubt the change was for the best.

A table of the incidence and mortality of scarlet fever was presented, showing the experience in New York City for the past six years and this was a standard table. The figures showed that when averaged up for all Boroughs of the City, the fatality varied from 6 per cent. to 4 per cent., the latter of which it was at present.

It was interesting to note the variations both in frequency and fatality. Particularly was it interesting to note the experience in Queens when in 1912 there were only six deaths but this was followed in the two succeeding years by a large increase being forty-six in 1913 and forty in 1914 which they were unable to account for as it did not behave like this in any of the other Boroughs and there was no apparent reason for it do to so in Queens.

Exposures to scarlet fever in schools were indeed most interesting. Mild cases, difficult of determination and other cases undiagnosed, no doubt were the source of many infections in the schools. It was not at all infrequent that desquamating cases of scarlet fever were found in the schools. If desquamating cases returning to school were promptly detected and all pupils exposed carefully watched, such an occurrence as the present of a convalescent or undiagnosed case arriving in school need not be followed by a number of cases. But the prompt recognition and disinfection of all places visited, and careful observation of all children exposed, must be done carefully to accomplish such a result.

The remedy for school infection he said laid in the following methods: School Inspectors must be alert and keen to observe the presence of infection and they should be especially on the lookout for mild cases and in addition the teachers and mothers should be educated in order to be able to recognize the early cardinal symptoms of scarlet fever.

SCARLET FEVER—GENERAL STATISTICS OF INCIDENCE AND MORTALITY.

Year	Cases reported	Cases per 1000 population	Deaths	Deaths per 1000 population	Case fatality, per cent.
New York City					
1909.....	12,479	2.73	786	0.17	6.2
1910.....	18,924	3.93	953	0.19	5.0
1911.....	15,793	3.16	741	0.14	4.6
1912.....	12,716	2.45	615	0.11	4.8
1913.....	10,719	1.99	507	0.09	4.7
1914.....	11,105	1.99	451	0.08	4.06
1915.....					
Manhattan					
1909.....	5,909	2.46	358	0.15	6.0
1910.....	8,722	3.81	448	0.19	5.1
1911.....	6,799	2.84	360	0.15	5.2
1912.....	6,023	2.51	314	0.12	5.2
1913.....	4,138	1.66	206	0.08	4.9
1914.....	4,817	1.89	252	0.09	5.3
1915.....					
The Bronx					
1909.....	1,161	3.33	50	0.14	4.3
1910.....	2,264	5.15	75	0.17	3.3
1911.....	1,663	3.44	55	0.11	3.3
1912.....	1,618	3.04	54	0.10	3.3
1913.....	1,067	1.40	48	0.08	4.4
1914.....	1,526	2.38	37	0.58	2.4
1915.....					
Brooklyn					
1909.....	4,275	2.77	326	0.21	7.6
1910.....	6,474	3.93	385	0.23	5.9
1911.....	6,136	3.58	295	0.17	4.8
1912.....	4,321	2.43	225	0.12	5.2
1913.....	4,344	2.37	196	0.11	4.4
1914.....	3,469	1.81	119	0.06	3.4
1915.....					
Queens					
1909.....	856	3.49	42	0.17	4.9
1910.....	985	3.41	33	0.11	3.7
1911.....	876	2.82	23	0.07	2.6
1912.....	551	1.64	6	0.01	1.0
1913.....	839	2.60	46	0.13	5.4
1914.....	987	2.55	40	0.10	4.1
1915.....					
Richmond					
1909.....	278	3.56	10	0.12	3.5
1910.....	479	5.53	12	0.13	2.5
1911.....	319	3.67	8	0.08	2.5
1912.....	203	2.19	6	0.06	2.9
1913.....	331	3.45	11	0.11	3.3
1914.....	306	3.09	3	0.03	0.9
1915.....					

After describing the present system of control of infectious diseases in New York City, Dr. Hubbard said that while in many diseases they had positive facts regarding causation and communicability, unfortunately they did not have these in dealing with scarlet fever, but the principles of control consisted in regarding the patient as the original source of infection and in concentrating all efforts here. The most frequent carriers of infection were the patient, persons coming in contact with the patient and the patients' surroundings, *i.e.*, the room, bedding, clothing, utensils, toys, books, etc., and the place of business and the associates thereof. This being accepted, control must be exercised by safe and sane quarantine, continued until every possible danger signal was passed both for the patient and the public. The quarantine to be effective must be wholly efficient, and in New York was supervised and directed by a corps of supervisors and nurses. Systematic and careful espionage was more or less constantly exercised varying with the class of case under consideration. Cooperation of all concerned was the keynote, and no hard and fast rules were applied to any case. Home visits were made with a desire to impart instruction, gather necessary details for control and statistical information, and if social welfare aid was needed it was furnished. Convalescence was supervised and the patient afforded every opportunity for a safe and speedy recovery and the public was protected from recurrence of the disease in that or other homes. Poverty and ignorance were their greatest opponents. Remove these and rigid quarantine could be exercised with positive prevention of sickness and the saving of many lives. Men and money were often inadequate but intelligent application of what was available would result in an appreciable and effective control.

DISCUSSION.

DR. HAVEN EMERSON did not feel competent to discuss Dr. Berg's paper. Dr. Donnally's paper put the matter before health officers in rather a bad light. In communities in which the death rate seems high it usually means a failure to report cases and that there is lack of an effective method of impressing on the community the necessity of reporting cases. Health officers do not feel so hopeless regarding the situation as the statistics presented might lead one to assume. A number of outbreaks of scarlet fever had been traced to the milk supply and with an improvement of the milk supply there should be a decreasing number of cases of scarlet fever. Pasteurization of the milk supply seemed to have some bearing in decreasing the number of cases of scarlet fever and also the number of cases of septic sore-throat and even of tonsillitis. From 1868-1877 the death rate from scarlet fever was 91 per 100,000; from 1908-1912, 18 per 100,000; a gain of 80 per cent., and there has been a further fall in case rate and mortality since 1912.

Dr. Emerson said it was not fair to check off mild undiagnosed cases against severe undiagnosed fatal cases since there was no evi-

dence to show that they would balance one another. In Poughkeepsie where they recently had an epidemic of so-called septic sore-throat, when physicians had their attention directed to the matter they admitted that many of the cases were cases of scarlet fever.

The Health Department is now using a system of recording non-susceptibles. When a case of infectious disease is reported and the diagnosis verified the patient is supplied with a certificate to the effect that he or she has had that disease and may be regarded as immune. In this way there is an increasing number of children whose attendance at school need not be interfered with because of a case of that particular disease in the same house provided the patient can be properly isolated and watched. Of course, it is an economic advantage to the city to keep as many children regularly in school as possible.

Dr. Emerson also called attention to an interesting observation made during the last year with reference to the recognition of cases of communicable disease. They had found that there had been a mistaken diagnosis on the part of physicians reporting cases of communicable disease in only 13 per cent. of the cases reported.

DR. MEYER SOLIS-COHEN, Philadelphia, said that he felt that it was a great disgrace, if, as Dr. Donnally had said, there had been no striking reduction in the morbidity rate of scarlet fever. If it is true that we are making no progress in the control of the disease as Dr. Hubbard states, it behooves us to find out why the disease is always present. Dr. Solis-Cohen taking exception to Dr. Donnally's statement, thought the unreported cases were far in excess of those dying without the disease being recognized. He gave several illustrations to show the prevalence of unrecognized cases. Recently a physician in Philadelphia found a case of scarlet fever and ordered the patient to the hospital. The ambulance surgeon said the case was not one of scarlet fever. As medical inspector, Dr. Solis-Cohen said he decided that the case was one of scarlet fever. On asking if any other children in the house had had a rash he was told that two children had measles, and on examining them found them desquamating. He then asked if any children in the neighborhood had had measles and was told of two cases in the next street whom he also found desquamating. In another instance he investigated the case of a child said to have a rash after having been burned; the child had scarlet fever. A supposed case of measles in another room had scarlet fever and three other children have a history of measles within the previous six weeks. Two of these showed nothing abnormal, but one was found in school desquamating. This child lived with a sister whose baby also had measles and was found desquamating. These mild cases of scarlet fever should be watched for, especially during an epidemic of measles or of German measles, for it is at such times that they are likely to pass unrecognized; and it is the unrecognized cases that are responsible for epidemics and for the fact that the disease is always endemic.

The remedy for the scarlet fever prevalence is not to be found in more efficient quarantine, for Dr. Hubbard has said that the efficacy

of quarantine has no influence on the disease, it is to be found in the recognition and control of mild cases and this can be brought about by popular education, as Dr. Hubbard has suggested, but not so much as to isolation and quarantine as by the danger of mild unrecognized cases and as to how to recognize them. The fact that 90 per cent. of the cases of scarlet fever are under fifteen years of age, as Dr. Donnally has demonstrated, and that consequently many occur in school children shows that these may be reached through the school. Only the medical inspector should not wait until two or three cases develop before examining the school but after the first case should go and make an inspection of every child in the school and must then keep on going through the school until the period of incubation has passed since the finding of the last case. He must go even further and examine on its return to school every child recovered from ivy-poisoning, measles, and German measles, etc., for there is a possibility that these may have been scarlet fever. The mild cases do not have a physician in many instances and consequently are not reported. In order to get control of them the public must be educated to the point that it will regard every child with a rash as a dangerous individual. We must educate the people to the point that they will regard every child with a rash as a dangerous individual and will report to the health authorities every case of eruption in their neighborhood, especially if such a case is without medical attention. We should have a law compelling the householder to report cases of contagion occurring in his house, even if the physician does not do so, just as a birth must be reported by the householder if there is no attending physician or midwife to report it. Physicians who fail to report their cases should be prosecuted; to allow a man to make a practice of not reporting cases is unfair to the honest physician. It will not be difficult to discover them if these other suggestions are carried out. When children are absent from school for unknown cause they should be visited by some official, inspector, nurse or attendance officer, who will discover the presence of a contagious disease if such exists. Even where a child of one or two years of age is ill and the case is not reported, the mother usually keeps the older children home from school, and if every case of absence from school were investigated by the attendance officer of the school, this officer would find the cases of illness and should then report them.

DR. W. L. SOMERSET wished to say just a word concerning the hemorrhages in the eruption; he did not wish to differ from Dr. Berg but to add that certainly in scarlet fever petechiæ or small hemorrhagic areas were not necessarily rheumatic and did not have a perceptible effect on the clinical course of the disease. The discovery of the Klebs-Loeffler bacillus and the control of diphtheria by antitoxin may have had a marked effect on the morbidity and mortality of scarlet fever, since the two diseases frequently occurred together. Twenty-five years ago there was little or no attempt to distinguish between diphtheria and scarlet fever and we now know that the scarlet fever patient develops diphtheria in many cases. Now every

case of scarlet fever entering a hospital was given an immunizing dose of antitoxin and there were fewer instances of this complication.

The statement was made that 1 per cent. of the cases of scarlet fever occurred in infants under one year of age, while it was his impression that a very small fraction of 1 per cent. of the cases occurred at this early age.

In reference to the confusion of scarlet fever with milk-borne sore throat, Dr. Somerset emphasized the point that one could not safely make the diagnosis of scarlet fever "*sine eruptione*."

DR. HENRY HEIMAN did not think Dr. Berg wished to convey the impression that cases of peliosis rheumatica were voluntarily left in the scarlet fever ward of Willard Parker Hospital, after a diagnosis had been made.

As to albuminuria, that may occur in any infectious disease. In scarlet fever cases, as a rule, if nephritis develops, it is usually about the third week. It requires that length of time for the scarlet fever toxins to begin their destructive action on the cells of the kidney. In both the septic type and the encephalitis type of scarlatina the prognosis may be favorable. I have seen recovery after a case of hemiplegia complicating the encephalitic type.

The statistics were interesting and instructive, but one point with reference to the control of scarlet fever, is that the period of quarantine is entirely too long. Dr. Goldwater has curtailed the period of quarantine for measles to six days; that for scarlet fever might be curtailed to three weeks. Dr. Heiman believes that a shorter quarantine would give better results because people will be more ready to report cases of infectious diseases and more willing to cooperate in enforcing quarantine. The physician attending a contagious disease should do his part by washing his hands, spraying his nose and gargling his throat after coming in contact with these cases, for he must not lose sight of the fact that the healthy person is just as dangerous as a carrier of infection as the person who has the disease.

Dr. Heiman said it was extremely difficult to recognize scarlet fever in certain cases; and in some cases he did not believe anybody could do it.

DR. LOUIS CURTIS AGER, Brooklyn, said that statistics were always interesting. These demonstrated what different ideas different individuals might get from the same set of figures. Old New York had a high mortality rate in comparison with the morbidity rate. Dr. Donnally seemed to attribute this to locality, to the fact that some places seemed to show a high mortality and some a low one, but why would it not be more reasonable to say that the apparent high mortality was due to laxity in reporting cases? Dr. Donnally says that the morbidity rate is unchanged, is it not just as reasonable to say that as the result of education the number of cases has been greatly reduced but the percentage of cases reported is much greater than formerly, so that in reality it may be that there is a lower morbidity rate as well as a lower mortality rate than formerly and we are making progress in controlling the disease.

DR. HENRY BERG congratulated Dr. Donnally on the enormous amount of information that he had collected. The man who merely read the paper did not immediately grasp the large amount of information that it contained. There was in it a great deal that would aid in prognosis and the figures spoke of the utility of healthy department work. It showed that the statistical returns in Russia were more reliable than is generally supposed and that a much larger number of cases were reported in proportion to the population in Russia than in some of our larger cities. The peasantry were probably very carefully supervised in matters of contagious disease, every one in Russia being accustomed to submit to governmental authority.

Dr. Berg said he would look forward to the publication of Dr. Donnally's paper that he might read it not once or twice but many times.

DR. HARRY H. DONNALLY, Washington, D. C., in closing the discussion, said that he knew that all cases were not reported and had said so. The fact that mild cases were not reported and that certain severe cases died without scarlet fever having been given as the cause of death worked to make the morbidity figures inaccurate. He had not claimed that the fatality figures were strictly accurate and he did not believe that they were, but that they were probably approximately so, and gave a fair idea of conditions.

The point brought out by Dr. Emerson that deductions from combined groups of cases were fallacious was well taken, but it was interesting to get the figures roughly from such a large combination.

One of the main points in his paper had been the proof of a genius of locality both for morbidity and fatality.

He had referred to Johannessen's book, "*Die epidemische Verbreitung des Scharlachfiebers in Norwegen*," which appeared in 1884 and which was quoted by most authors. When it appeared it had attracted much attention and brought the author honors, so that altogether reporting of scarlet fever in Norway had become very excellent. No place studied had higher efficiency probably in this regard. Norway's figures showed a decline both in morbidity and in fatality. Therefore, health officials should not feel discouraged.

He did not believe that all of the cases reported under one year of age were actually scarlet fever, but could not go back of the figures as presented in the health office reports.

DR. HUBBARD, in closing the discussion, in answer to a query, said that there was a law requiring doctors, superintendents and managers of hospitals to report cases of scarlet fever also cases suspected of such disease and also a law requiring every person having knowledge of the existence of disease to report that fact to the Department of Health. In the latter instance the difficulty of enforcing the ordinance was in the fact that it was difficult to obtain evidence of knowledge of the fact—that but few laymen knew what scarlet fever was when they saw it.

With reference to the element of time in the quarantine of this disease it was appreciated that thirty days' minimum period was an

arbitrary period pure and simple. The Department had no method of determining the period of infectivity in scarlet fever and so had to accept the opinion of its medical advisers. In measles the work of Bordet and Gengou and later supplemented by Messrs. Anderson and Goldberger had enabled the Department to eliminate fourteen days in that disease and substitute a minimum period of five days.

In New York City the time was reduced to thirty days in conformance with the regulations of the New York State Department of Health, but that thirty days was a purely arbitrary period and if any physician had reason to believe the same was unnecessary and inflicted in certain instances a hardship or was detrimental to the patient, if they would bring the matter to the attention of the Department, giving all facts, the case would receive careful consideration, and if it was safe to do so the case would be discharged on its own merits as the facts warranted, whether it was twenty-one days or more. Time therefore was for a guide only, it being appreciated that if quarantine was established and maintained upon purely scientific principles both physicians and their families would endeavor to aid the Department in controlling this very frequent and annoying disease.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Infections of the Tonsil.—In the Hunterian lecture, F. C. Pybus (*Lancet*, May 15 and 22, 1915) says that the principles to be adopted in the treatment of tonsillar disease may be summed up as follows. So far as the individual is concerned, where the symptoms are mainly or entirely mechanical, and fail to subside in three months after removal of any source of infection, partial removal may suffice. Tonsillotomy, however, has this disadvantage—the basal portion of the tonsil may enlarge and again cause symptoms. In addition to this many hypertrophied tonsils, so far as can be ascertained on inspection, do not appear to be grossly infected. In those cases which are grossly infected the basal portion, often the most diseased, is left behind and may commence to give trouble, especially if some of the lacunæ become partially or entirely sealed up in the process of healing. When infective symptoms predominate in the tonsil itself, such as acute tonsillitis or chronic lacunæ infection, or when the tonsils are in addition enlarged, any source of infection must be removed, especially carious teeth. Nasal breathing must be re-established, and the case watched to see the effect of the treatment. Where the tonsil is too severely affected to be capable of recovery, as judged by the recurrence of symptoms and the failure of the above measures, then total removal is indicated. For lymphatic gland infections, where tuberculosis is suspected tonsillectomy is indicated; the course of the glandular enlargement determines whether this also may re-

quire operation. In pyogenic infections of the glands the tonsil must be dealt with when the acute lymphadenitis has subsided or been operated on if suppuration has supervened. Chronic glandular enlargement of the mild or moderate degree is so frequently met with in hypertrophied tonsils that when the tonsil recovers its normal character the glands subside also. It should be a rule that no tonsil should be removed when acutely inflamed. For more distant infections, when the tonsil is suspected of being the focus, removal is indicated when the general condition is satisfactory. In all these cases total removal is the operation of choice. While these methods directed to the individual are of great importance, prevention of tonsil infection should be our chief aim. This is to be obtained by the advance of hygiene, personal, in the home and school. The maintenance of nasal respiration, the prevention of dental caries, and the proper supply of food in sufficient quality and quantity will greatly diminish the prevalence of this condition. The provision of a cleaner air supply and the prevention of infection by milk are measures needing attention. The question of infection of the tonsil and from the tonsil is not to be summed up in some form of operative procedure.

Humanized Milk in Infant Feeding.—As a useful food for the average healthy infant who is under the care of the busy general practitioner, J. Epstein (*Med. Rec.*, May 29, 1915) recommends the use of the upper 15 ounces of a quart bottle of milk diluted with an equal amount of water. So diluted and with sugar added to make 7 per cent. it has the following percentage composition: protein, 1.70; sugar, 7; fat, 4; salts, 0.35; water, 86.95. This corresponds quite closely with the composition of human milk, which is: protein, 1.50; sugar, 7; fat, 4; salts, 0.20; water, 87.30. Having decided by the weight, age, and general condition of the infant how many ounces of food it requires at each feeding and the number of feedings in twenty-four hours, the mother is directed to use the upper 15 ounces of one or two quart bottles of certified raw milk and out of these 15 or 30 ounces of milk she takes as many ounces as she is directed, and to this she adds an equal number of ounces of cooled boiled water, to which the proper amount of milk sugar has been previously added. The entire quantity of food which is made up of half milk, half water, and sugar is now equally divided into the number of feedings required and fed at regular hours.

Sex Distriution in Rickets.—In the routine examination of school children of the ages of five to six and eight to nine, 75,268 in number, and about equally divided between the sexes. J. Priestley (*Brit. Jour. Child. Dis.*, 1915, xii, 173) noted marked signs of rickets in 2.04 per cent. of the boys and 1.13 per cent. of the girls. During three years of this five-year period even traces of rickets were recorded. The percentage then became 27.3 for boys and 16.3 for girls, bearing out, however, the greater prevalence among males.

Hypertrophy of the Thymus and Thymus Death.—In reporting two cases of each of these conditions, T. Le Bontillier (*Arch. Pediat.*, 1915, xxxii, 320) says that no infant or young child should come

under observation without a most thorough and careful examination of the chest in the region of the thymus gland, to determine if there is an enlargement of this gland. This is especially true in children who have slight or marked dyspnea or cyanosis which cannot be traced to any other condition. In any case, where the diagnosis is not absolute, the child should be x-rayed. I feel sure that in many instances there is a more or less sudden engorgement of the thymus gland due to some derangement in the general arterial system which may in some cases be great enough to cause death; that tracheostenosis is a positive condition and that death is caused by it in certain cases; that the importance of enlarged thymus in goiter must not be overlooked.

Breast Feeding.—To emphasize the need for correlation between (1) the periodicity in the secretion of milk, (2) the size of the meals, and (3) the infant's appetite, is the object of a contribution by H. K. Waller (*Jour. Obst. and Gyn. Brit. Emp.*, 1915, xxvii, 74). Efforts to control the flow of milk which do not take into account the periodic character of its secretion are likely for the most part to end in failure. For the establishment of lactation all that seems necessary is the regular stimulation of suckling with a sufficient interval between the infant's meals. If this be observed the woman will become aware of a sensation which is variously described as a rushing, tearing, or painful stabbing in the breasts, known as the "draught" and experienced as soon as the child's mouth is applied to the nipple. In some the breasts can be observed to swell and become tense where a few moments earlier they were flaccid and apparently empty. In cases where the periodicity is firmly established the engorgement may even occur at the appointed time without the breast being stimulated by suckling; the flow lasts for a few minutes and then ceases. Maintenance of the "draught" throughout the course of lactation is perhaps the surest sign that breast feeding has been normally carried out, and this is reflected in the almost invariable progress of the infants so fed. Conversely, in all cases where a child has taken the breast for a few weeks and the "draught" is only felt occasionally or not at all, suspicion should be roused that the régime is not satisfactory. Until this is regulated to meet the physiological requirements of the gland, the opinion should be withheld that successful breast feeding is not feasible. Too frequent suckling is the commonest cause of impoverishment of the milk. The custom of urging women to feed their infants at two-hourly intervals nine or ten times during the twenty-four hours is responsible for weaning in an enormous number of cases. A month is about the limit of time for which a woman can endure the two-hourly imposition. To obtain the maximum output of work a suitable stimulus must be applied at a suitable interval. In some hundreds of cases where test meals have been taken their size has been found to increase as the frequency of the administration has fallen. Further, it has been found over and over again that the total quantity in twenty-four hours is greater when the number of meals given is six rather than nine or ten, and greater still when the six give place

to five and four. In one of the writer's observations he shows that a child can take 7 ounces of food from the breasts at one meal as early as the twenty-first day.

Prevalence of Congenital Syphilis among the Newly Born of the East End of London.—The object of an investigation by P. Fildes (*Jour. Obst. and Gyn. Brit. Emp.*, 1915, xxvii, 124) was to determine the incidence of syphilis in infants as a result of a congenital infection. For this purpose it was arranged to perform the Wassermann test upon 1000 infants at birth, and again upon the same infants and their mothers at a certain period after birth. It is assumed that the great majority of cases of congenital syphilis will develop a Wassermann reaction in two and a half to four months after birth. The population examined was probably representative of other groups of similar social status in different parts of London, namely, the respectable laboring classes. In this population: (a) Only one baby in 1015 showed symptoms of syphilis at birth. (b) Only three babies in 660 developed syphilis as evidenced by a positive Wassermann reaction during the period of observation, and of these only one showed symptoms. (c) Thus only four instances of syphilis were detected among 677 babies (5.9 per 1000), and of these one died and two showed no symptoms. (d) Only one child died of syphilis, while sixteen were lost presumably from other causes. Twenty-seven (3.9 per 100) of the women gave a positive Wassermann reaction, but only four of these transmitted syphilis. The Wassermann reaction obtained with blood from the placental end of the umbilical cord is not diagnostic of syphilis in the infant but of syphilis in the mother. However, only a minority of syphilitic women induce this positive reaction in the umbilical cord serum, and only a minority of syphilitic children give this reaction at birth. The observations made in the population thus studied point to the conclusion that the ravages caused by congenital syphilis in infants are sometimes exaggerated.

Condition of the Larynx and Trachea in the Stillborn Infant and its Bearing on Artificial Respiration.—E. A. Barton (*Jour. Obst. and Gyn. Brit. Emp.*, 1915, xxvii, 138) says that on examination, post-mortem, of a number of stillborn children in whom no air has passed the glottis one finds in the majority of cases the following condition. For about $\frac{1}{3}$ inch below the glottis, which is invariably closed, the trachea is open, narrowing like a funnel from above down till the point is reached where the lumen is entirely obliterated by the folding in of the ends of the cartilaginous rings behind. The trachea is now flattened from before back, and where the posterior part of the rings meet one another on the dorsal surface is a vertical groove. The muscular posterior wall of the trachea is folded in such a manner that by its contraction the infolded cartilage ends would be separated and an actual lumen be formed from a potential one. This condition holds till the region just below the bifurcation, where the irregularity of the disposition of the cartilages prevents the complete apposition of the surfaces, the lumen again being filled with mucus. This does not, however, apply to all cases, as in a few the trachea is

filled with mucus and open throughout its length though flattened, suggesting that some inspiratory effort had been made which, contracting the posterior wall of the trachea, had unfolded the cartilages even with the glottis closed. Such a condition might have taken place at the moment of birth. One may look on the thorax as a whole, then, as an airless, semi-rigid body, the lungs completely atelectatic and the ribs in close contact with them. Therefore at birth the thorax occupies a smaller space than it can ever occupy after the first breath, let expiration be ever so complete. There is some reason, too, to suppose that the ribs before the first breath are under an outward elastic tension tending to expand the chest and aiding by their outward spring the completeness of the first inspiration. The reason for this assumption lies in the fact that on opening the chest of a child that has never breathed there is a considerable space between the chest wall and lungs, the latter appearing to lie at the bottom of a definite cavity. As the airless lungs cannot alter their volume this cavity must be made by releasing some tension in the chest wall itself. The first inspiration of life therefore is a very complicated process: The glottis must be opened, the posterior wall of the trachea must contract and by its contraction unfold the curled cartilages, converting a closed into an open tube, the ribs under. To attempt to apply Sylvester's method to a child who has made no effort to breathe, or rather in whom the glottis is still closed and the trachea empty of air, is waste of precious time. If the newborn infant has never made an attempt to breathe and makes no effort the glottis must be mechanically opened either by intubation or blowing into the child's mouth, the latter being performed with the child's nose closed. The small risk of intubation lies in lacerating the vocal cords, but it is far easier to force a current of air into the chest by holding the child's nose and blowing into its mouth. This may drive air into the Eustachian tubes and middle ear, and certainly blows air into the stomach, but the writer has never seen bad results from either cause. The force used should not be great and as soon as the lungs are distended and physical or artificial respiration is carried out easily.

Treatment of Infantile Paralysis.—In a study of 149 cases in the Vermont epidemic of 1914, R. W. Lovett (*Jour. A. M. A.*, 1915, lxiv, 2118) found that partial paralysis was much more common than total. Of 1452 muscles affected, 416 were totally paralyzed and 1036 partly, that is, the relation of partial to total paralysis was as 2.5 to 1. He regards one point as fairly well established by his analysis, namely that there is another factor beside the plain anatomic distribution of the lesion in the cord which determines something of the extent and severity of the residual paralysis. Illustrative cases which he cites seem to show that much smaller degrees of overuse may be deleterious than is generally supposed. Probably any of us would agree that gross and persistent overuse of partly paralyzed muscles would be undesirable; but it seems reasonable that in the early stage of returning power, we should be exceedingly careful in the use of muscles in walking and in the use of heavy and

prolonged massage, much more careful than we are. The proportion of total to partial paralysis is greatest in the muscles which have the greatest weight to oppose in the standing and walking position and least in those which have the least weight, in a series of cases observed some months after the acute attack. If overuse is the harmful factor that the writer believes it to be in retarding recovery, its effect would be noted in just those muscles which show the highest proportion of total paralysis.

Diagnosis and Treatment of Pyloric Stenosis and Pyloric Spasm.—In order to help clear up some difficulties in diagnosis and treatment C. H. Dunn and W. W. Howell (*Arch. Pediat.*, 1915, xxxii, 426) report the cases of pyloric stenosis and the cases on which the diagnosis of pyloric spasm has been made at the Infants' Hospital since opening, March 4, 1914. There were six cases with a diagnosis of pyloric spasm. This diagnosis is made on cases with a history of faulty feeding, vomiting, gastric peristalsis, a patent pylorus as shown by x-ray and the character of the stools, easy introduction of a duodenal catheter, and which are relieved by some change in diet. That this class of cases are bad cases of gastric indigestion is indicated principally by the fact that they are relieved by some change in diet and stomach washing. The treatment for these cases is to modify the food according to the element of the food causing the trouble, breast milk if necessary, and daily stomach washing. There were six cases of complete stenosis and three cases of partial stenosis. The diagnosis of complete stenosis was made on the following points: Discomfort and vomiting, usually projectile, directly after feeding, unless there was dilatation of the stomach with collective vomiting, peristalsis, tumor, hunger stools, progressive loss in weight. All six cases showed these diagnostic points. The diagnosis of partial stenosis cases depends on the history, which is similar to that of the complete cases, except as to hunger stools; presence of peristalsis, which is usually more marked than with the spasm cases; fluoroscopic and x-ray examination; passage of the duodenal catheter, which goes through the pylorus, but with difficulty; and, finally, that they are not relieved by changes in diet, eliminating one element of the food after another in the attempt to find a possible food factor in causing the vomiting. If a tumor is found of course the diagnosis is made more certain, but it is not necessary to find a tumor for diagnosis. Cases of partial stenosis should be watched, and if there is no relief from vomiting and no satisfactory gain they should be operated on by some operation on the pylorus.

Relation of the Gas Bacillus to Infectious Diarrhea and Other Digestive Disturbances in Childhood.—P. H. Sylvester and F. H. Hibben (*Arch. Pediat.*, 1915, xxxii, 457) state that the gas bacillus is not a normal inhabitant of the intestinal tract. Its pathogenicity is apparently demonstrable in certain cases of infectious diarrhea, fat intolerance, carbohydrate intolerance, and chronic intestinal indigestion. The dietary treatment by means of fat-free lactic acid milk unpasteurized, by imposing conditions unfavorable to the

growth and activity of the gas bacillus, is rational, safe and more immediately effective than any other treatment so far advocated. It is as follows: To give unpasteurized lactic acid milk exclusively until the stools are gas bacillus-free for three successive plants at two or three-day intervals. When gas bacillus-free, (a) continue a small amount of lactic acid milk daily; (b) gradually increase the amount of food to normal caloric requirements by adding skim milk and cautiously small amounts of carbohydrates, preferably in the form of maltose and very well-cooked starches, testing for gas from time to time. Add fat to the diet after weeks or months, in very small amounts, watching stools frequently for undigested fat. When there is a recurrence of the gas bacillus, treatment should be repeated. This treatment was used in the writer's cases where the gas bacillus was present as follows: Infectious diarrhea, thirty-one cases, of which two died (moribund on admission); twenty-nine got clinically well within five days. Of nine not so treated none recovered within three weeks, and three, after weeks of other treatment, were given the above and got well in four days. Of four mixed infections none really improved. Of cases of fat intolerance twenty were so treated and rapidly became free from symptoms of disturbed metabolism; nine not so treated showed persistent evidence of disturbed metabolism. Of three cases of carbohydrate intolerance all showed marked improvement in stools. None did not receive the above treatment. Of fifteen cases of chronic intestinal indigestion eleven were so treated and immediately improved, although recurrence took place in most of them, to be immediately relieved by the return to the fat-free lactic acid milk. Of four not so treated all persisted for months.

Differences in Digestion in Adults and Infants.—In the study of J. F. McClendon (*Jour. A. M. A.*, 1915, lxxv, 12) the acidity of the stomach and reaction of the duodenal contents was measured by means of hydrogen electrodes. Indicator papers were calibrated so that clinicians may determine hydrogen ion concentrations approximately. After a normal meal, the acidity of the adult stomach reaches its maximum in from two to three hours, the rise in acidity being more rapid the lighter the meal. The height to which the acidity rises varies with the individual, the highest observed in a normal individual being 0.1 normal (about 0.4 per cent. of pure hydrochloric acid). The hydrogen ion concentration of the duodenal contents is 0.00000002 normal. This is slightly alkaline, since that of pure water is 0.00000011 at 25° C. (77° F.). The acidity of the infant's stomach rises slowly after the milk begins to leave it, and four hours after nursing may be the same as some normal adult stomachs. That of the gastric juice of the new-born is 0.005. The acidity of the duodenal contents of the infant is 0.0008, and hence it is probable that both peptic and tryptic digestion take place in the intestine of the infant. Pepsin was always found and was apparently more abundant (active) than the trypsin.

INDEX.

A

Abderhalden test. Falls.....	507
Abdominal Cesarean section, a modification of the technic of. Brown.....	415
hysterectomy for cancer of the uterus. Maurer.....	519
hysteropexy direct, physiological and pathological results of. Muret.....	1065
skin, disinfection of the, before operation. McDonald.....	724
surgery, the relation of pelvic to. Wetherill.....	615
Abortion reactions, epidemic, in children. Sedgwick and Larson.....	925
Abscess, parapharyngeal, as distinguished from retropharyngeal and peritonsillar abscess. Heiman.....	360
perinephritic. Richardson.....	725
Accessory nasal sinuses, diseases of the, in the first year of life. Onodi...	384
Acidosis in children. Howard.....	939
Acker. Address of the president.....	354
Acute pyelitis. Wood.....	570
Adams. Transposition of viscera in an infant.....	381
Adnexa and pregnancy, inflammatory lesions of the. Ferroni.....	351
Adrenalin, influence of, on the blood condition in pregnancy. Aymerich.....	720
Alexander-Adams operation and its results. Madill.....	1063
Allergy to common foods. Schloss.....	367
Amaurotic family idiocy in one of twins. Herrman.....	553
American statistics on scopolamin-morphine narcosis; report of 1000 cases of labor. Beach.....	480
Ammonia and urea content of infants' stools. Gamble.....	942
Ampullar pregnancy. Wiener.....	469
Anaphylaxis, serum, in men. Bessau.....	206
Anatomy, pathological, of tuberculosis in children. Ghon.....	564
Anesthesia, local, further experiences with, in herniotomy. Jacobson....	783
mechanical, the etherometer a means for. Montgomery.....	133
nitrous oxide-oxygen. Mosher.....	1055
Anspach. The treatment of advanced carcinoma of the cervix with radium.....	97
The value of a more frequent employment of episiotomy in the sec- ond stage of labor.....	711
Antidiphtheritic serum, proteolytic ferments in patients injected with. Reisz and Barabàs.....	936
Antimumps inoculation. Hess.....	183
Antitoxin, diphtheria. Kleinschmidt.....	571
Anus and rectum, congenital defects of. Brenner.....	943
Appendicitis, acute, in children. Aynesworth.....	893
chronic, tubal abortion and. Boldt.....	1039
pointing in the left flank. Proust and Paris.....	727

Appendix, the surgery of the. Keefe.....	821
Arterial tension and blood viscosity in pregnancy and their relations. Pellissier.....	515
Arthropathy, hypertrophic pulmonary, in a girl of eleven years. Hermann.	1070
Artificial food, adaptation of, to human milk. Gerstenberger, Haskins, McGregor and Ruh.....	374
impregnation, experiments in. Prochownick.....	512
Astley. Shoulder presentations, with report of three cases.....	294
Atonic form of cerebral diplegia. Foerster.....	565
Atrasic bicornuate uterus, pregnancy in the rudimentary horn of. Pintor.	172
Atrophy, acute yellow, of the liver in pregnancy with recovery. Frank..	1031
Aynesworth. Acute appendicitis in children.....	893

B

Bacillus, gas, relation of the, to infectious diarrhea and other digestive dis- turbances in childhood. Sylvester and Hibben.....	1091
Bacteria-free vaccine. Noguchi.....	531
Bacterium Welchii, occurrence of, in the dejecta of children. Knox and Ford.....	199
Baldwin. Report of ovarian tumor, the size of a fetal head, composed of thyroid tissue.....	328
Bardin. Cerebrospinal meningitis during the Texas epidemic.....	925
Baumm's method, induction of labor by. Szenasy.....	510
Beach. American statistics on scopolamin-morphine narcosis; report of 1000 cases of labor.....	480
Beestings and bee-poison as a therapeutic measure in chronic rheumatism of children. Langer.....	565
Bell. An unusual case of myofibroma, complicating pregnancy.....	1002
Benzol, chronic lymphatic leukemia treated with. Rolleston.....	202
treatment of lymphatic leukemia. Meyers.....	570
Berg. Scarlatina: some unusual and severe types.....	1074
Bilateral corpus lutein cyst. Ford.....	333
glioma of the retina. Hansell.....	941
luteincystomata, large, of the ovary, a case of chorioepithelioma uteri with. Schwarz.....	645
Bismuth pills, use of, in the fluoroscopic examination of the infant's stomach. Hess.....	940
Bladder function after confinement and after gynecological operations. Taussig.....	503
Block. Some observations on the treatment of dysmenorrhea.....	945, 1046
Blood and eclampsia, sugar in the. Wieden.....	510
coagulation in infancy. Shaw and Williams.....	744
condition in pregnancy, influence of adrenalin on. Aymerick....	720
transfusion, direct, use of sodium citrate for. Schildecker.....	858
transfusion in infants and young children. Robertson and Brown..	575
Boldt. Chronic metroendometritis or fibrosis and marked interstitial salpingo-oophoritis.....	1039
Squamous cell cancer of the cervix.....	1038
Tubal abortion and chronic appendicitis.....	1039

Bone lues, early congenital. Kuth.....	766
necrosis, shortening of the healing time of, after operation. Bayer..	383
transplantation for the cure of tuberculous spinal disease. Jacobs..	199
Bones, fractured, fixation of, in infants and young children. Bradford and Soutter.....	764
Bonifield. Some comments on present tendencies in gynecologic and obstetric practice.....	769
Bony ankylosis of the spine in Pott's disease, method of securing, by means of a bony transplant. Halstead.....	944
Bottle-fed infants, institutional, cubic air space for. Southworth.....	357
infants, leucocyte counts during digestion in. Mitchell.....	938
Bovée. The use of the galvanocautery knife for excision of mammary tumors for microscopic diagnosis.....	25, 709
Braasch. Significance of vesical symptoms in the diagnosis of renal condition.....	500
Breast, cancer of the. Howard.....	354
feeding. Waller.....	1088
milk, influence of menstruation on. Grulee and Caldwell.....	768
Brettauer. Three cases of fibroids complicated by carcinoma of the intestines; resection, recovery.....	460
Brodhead. Cesarean section following primary section with bilateral oophorectomy.....	1030
Cesarean section for contracted pelvis and double multilocular ovarian cysts.....	478
Cesarean section with hysterectomy for fibroid uterus and contracted pelvis.....	478
Concealed accidental hemorrhage.....	1030
Bronfenbrenner. Serum-skin test for pregnancy and different pathological conditions.....	599
Broun. Early pregnancy complicated by bilateral ovarian dermoids.....	1026
Hysterotomy for large submucous fibroid.....	1027
Brown. A modification of the technic of abdominal Cesarean section.....	415
Bullen. Results of the Schick test at the Rochester Orphan Asylum.....	735
Buschmann. Unilateral impairment of the kidney in the toxemia of preg- nancy.....	624, 685

C

Cabot. Errors in diagnosis of renal and ureteral calculus.....	495
Caillè. Foreign body pneumonias.....	550
Calcium treatment of spasmophilia, remote results of. Rohmer.....	382
Calculi, ureteral. Geraghty and Hinman.....	516
Cancer, cervical, limitations of the radical operation for, of the uterus. Hutchins.....	1066
of the breast. Howard.....	354
of the uterus, abdominal hysterectomy for. Maurer.....	519
of the uterus, restricted hysterectomy completed by radium therapy in. Pozzi and Rouvier.....	727
preventing measure, destruction of cervical mucosa in subtotal hysterectomy as a. Tyler.....	728

Cancer, primary, of the female urethra. Crossen.....	153
squamous cell, of the cervix. Boldt.....	1038
Carcinoma, inoperable uterine, technic of applying heat in the treatment of.	
Percy.....	298-345
of the cervix, an improved ionization method for the treatment of.	
Massey.....	56, 157
of the cervix, treatment of, with radium. Anspach.....	97
of the intestine, three cases of fibroids complicated by; resection, recovery. Brettauer.....	460
uteri. Strong.....	431, 700
uteri, use of the Percy cautery in. Clark.....	517
Carstens. Remove the uterus instead of the ovaries for incurable cases of menstrual disorders.....	852
Caruncle, urethral. Young.....	518
Casein milk feedings in infancy and childhood. Gellhorn.....	935
Cattermole. Tuberculin tests in children of Colorado.....	920
Cecil. The use of sensitized gonococcus vaccine in gonorrheal vaginitis....	528
Cerebellar ataxia, acute, in children. Griffith.....	549
Cerebral hemispheres, energy metabolism of an infant with congenital absence of the. Talbot.....	366
intoxication, meningism and meningitis, clinical distinctions between. Heiman.....	185
spastic paralysis, operative treatment for selected cases of. Sharpe and Farrell.....	200
Cerebrospinal fluid in health and disease. Frazier.....	763
meningitis during the Texas epidemic. Bardin.....	925
meningitis, epidemic, serum therapy of, in childhood. Helmick....	203
meningitis, lavage of the spinal canal in. Aubertin and Chabanier..	943
Cervical implantation of the placenta, case of. Tiegel.....	1061
Cervix, squamous cell cancer of the. Boldt.....	1038
treatment of advanced carcinoma of the, with radium. Anspach....	97
Cesarean operation; its wider application; with report of cases. Parke. 281-340	
section, abdominal, a modification of the technic of. Brown.....	415
section following primary section with bilateral oophorectomy.	
Brodhead.....	1030
section necessitated by large Gaertner's cysts. Frank.....	467
Chapin. A clinical study of pneumonia in infants.....	915
A plea for accurate statistics in infant's institutions.....	539
Character, significance, and prognostic value of peritoneal exudates. Carlaw.....	1064
Chase. Radium in gynecological practice.....	90
Childbirth, the reappearance of menstruation after. Ehrenfest....	577
Child labor problem, report of committee on. Van Ingen.....	560
mentally backward, from the standpoint of the neurologist. Neu-straedter.....	521
welfare. Acker.....	355
Children, management of, between one and two years of age. Freeman....	767
Cholecystectomy versus cholecystostomy. Swope.....	803
Chorioepithelioma. Ford.....	333
a case of, three and a quarter years after the last pregnancy. Geist..	472
atypical. McClellan.....	1014

Chorioepithelioma, occurrence of, following a long period of latency after the last preceding pregnancy. Outerbridge.....	952, 1049
uteri, a case of, with large bilateral luteincystomata of the ovary. Schwarz.....	645
Chorea of Sydenham, etiological relationship of syphilis to. Koplik.....	547
voice sign in. Swift.....	205
Chute. Some errors in the diagnosis of renal infections.....	490
Chronic intestinal stasis, a contribution to the conservative surgery of. Meeker.....	981
Clark. Can pneumonia in children be aborted?.....	753
Craniometry in diseases of children.....	918
The logical interpretation of menstrual irregularities.....	341
The uses of desiccation surgery in gynecology,.....	63, 157, 345
Cleft palate, operative treatment of. Blakeway.....	571
Coagulation, blood, in infancy. Shaw and Williams.....	744
Cole. Technic and experimental application of hard rays for deep röntgenotherapy.....	705
Comments on present tendencies in gynecologic and obstetric practice. Bonifield.....	769
Complications of ovarian tumors, a study of. Wiener.....	209, 330
Composition of woman's milk. Holt.....	538
Congenital abnormality of the sigmoid. Van Sweringen.....	832
bone lues, early. Ruth.....	766
heart disease, an unusual case of, with demonstration of specimen. Morse.....	558
syphilis, prevalence of, among the newly born of the east end of London. Filders.....	1089
Contracted pelvis and difficult labor. Hornstein.....	421
Coxalgic pelvis. Briggs.....	172
Craniotomy in diseases of children. Clark.....	918
Cretinism, nervous. McCarrison.....	195
Crile. Newer conceptions of intestinal stasis.....	861
Crossen. Primary cancer of the female urethra; plastic work and late results.....	153
Currents, static, of value in gynecology. Hirsh.....	73, 157
Curtis. Laboratory diagnosis of chronic infections of the urinary tract in women.....	493
Cutaneous regional variation in the von Pirquet reaction. Colliver.....	205
Cyst, bilateral corpus lutein. Ford.....	333
dermoid, of the ovary with carcinomatous change. Frank.....	467
Cystalgia; Urethralgia. Roth.....	726

D

Darnall. Mesenteric thromboses, report of two cases.....	848
Desiccation surgery, the uses of, in gynecology. Clark.....	63, 157, 345
Developmentally deficient children twice born to same couple. Gayler....	729
Diabetes mellitus in children. Sherman.....	561
Diarrhea, infectious, and other digestive disturbances in childhood, relation of the gas bacillus to. Sylvester and Hibben.....	1091

Diarrhea, severe, indications for treatment, in infancy. Howland and Marriott.....	544
Dickinson. Gas-pains.....	864
The need of instructors and inspectors as hospital officers.....	385, 445
Dietetics of eczema. Lyman.....	570
Diffuse septic peritonitis. Bruce.....	354
Digestion, difference in, in adults and infants. McClendon.....	1092
disturbances of, in infancy. Morse.....	746
Diphtheria antitoxin. Kleinschmidt.....	571
persistent, treatment of, with diphtheria endotoxin. Hewlett.....	204
recent methods on treating. Neff.....	909
Schick toxin reaction for immunity in. Kolmer and Moshage.....	567
serum therapy in. Knospel.....	206
Diphtheritic paralysis and diphtheria antitoxin. Kleinschmidt.....	571
Diplegia, cerebral, atonic form of. Foerster.....	565
Disinfection of the hands and abdominal skin before operation. McDonald	724
Donnally. Scarlatina: Morbidity and case fatality, by locality, sex, age and season.....	1075
Drainage and dressing. Lott.....	612
Ductless gland therapy, a contribution to. Haynes.....	364
Dunn. Some studies on sugar in infant feeding.....	542
Dura mater, spontaneous and traumatic rupture of the, in the new-born. Moreno.....	506
Dynamic pulse examination of children and adults. Hotz.....	937
Dysmenorrhea, intranasal treatment of. O'Reilly.....	634, 688
some observations on the treatment of. Block.....	945, 1046
Dyspepsia, chronic, emulsions of liquid paraffin and castor oil in treatment of certain types of, in childhood. McNeil.....	202

E

Eastman. Tuberculosis of the urachus.....	640
Echinococcal invasion of the ovary. Young.....	353
Eclampsia and uteroplacental apoplexy, separation of the normally... situated placenta with. Zarate.....	353
blood and, sugar in the. Wieden.....	510
Ectopic gestation, some points in the diagnosis of. Harrison.....	698
gestation, three types of. Shoemaker.....	689
gestation, two cases of. Grad.....	1039
Eczema, dietetics of. Lyman.....	570
Ehrenfest. The reappearance of menstruation after childbirth.....	577
Eiweissmilch, results of treatment with. Baron.....	205
Empyema of the thorax. Wilensky.....	942
parapneumonic, in children. Gerhardt.....	569
Endometrium, hypertrophies of the. Gardner.....	516
Endotoxin, diphtheria, treatment of persistent diphtheria with. Hewlett.	204
Energy metabolism of a two months' old child fed on a prolonged protein rich diet. Hoobler.....	372
metabolism of hospital children. Murlin and Hoobler.....	207
Enteroptosis and pelvic relaxations, sinusoidal galvanic reversal current in. Massey.....	56, 157

Epidemic cerebrospinal meningitis treated with Flexner's antimeningitis serum. Smith.....	768
Episiotomy, value of a more frequent employment of, in the second stage of labor. Anspach.....	711
Etherometer, a means for mechanical anesthesia. Montgomery.....	133
Examination of stools in infancy. McClanahan.....	913
Extract, pituitary, in obstetrics. Rowland.....	172
Extracts of the placenta, action of. Colle.....	512
Extrauterine lithopedion. Maier.....	1054
pregnancy, three cases of. Oastler.....	1044

F

Fat indigestion, studies in. Dunn.....	567
Fats, placental. Santoro.....	721
Feeble-mindedness, syphilis as a cause of. Goddard.....	763
Feeding, bad, the remote effects of. Vander Bogert.....	742
breast. Waller.....	1088
infant, humanized milk in. Epstein.....	1087
influence of, on the growth of the brain in the first year of life. Sawidowitsch.....	381
onset of hunger in infants after. Tumpowsky and Carlson.....	939
Female genital passages, origin and phylogenetic significance of the. Wichmann.....	175
Ferments, a study of the specificity of, in pregnancy. Kolmer and Williams.....	101
Fetus, hydrops universalis, a study of. Schumann.....	138, 961
the action of salvarsan on the. Meyer.....	508
Fever, scarlet, prevention and control of, in New York City. Hubbard..	1078
undulating in its relations to pregnancy, labor, and the puerperal state. Laffont.....	352
Fibroid, large submucous, hysterotomy for. Broun.....	1027
tumor completely obstructing uterine canal; dead fetus long retained without infection. Pfaff.....	1018
Fibroids, ovarian. Hellman.....	518
three cases of, complicated by carcinoma of the intestine; resection, recovery. Brettauer.....	460
uterine, and uterine hemorrhage, Röntgenotherapy in. Pfahler....	703
Findley. The combined operation for the interruption of pregnancy and sterilization.....	1022
Fistula, vesicovaginal. Frank.....	1032
Fistula, postoperative ureteral, some observations upon. Furniss.....	837
Fixation of fractured bones in infants and young children. Bradford and Soutter.....	764
Flank, left, appendicitis pointing in the. Proust and Paris.....	727
Flora, intestinal, biological examination of the, in infants. Bluhdorn....	568
Fluoroscopic examination of the infant's stomach, use of Bismuth pills in the. Hess.....	940
Foods, common, allergy to. Schloss.....	367
proprietary infant, nutritive value of. Wheeler.....	573
Ford. Hydatidiform mole, chorioepithelioma, and bilateral corpus lutein cyst.....	333

Foreign body, case of child swallowing. Hartshorn.....	1073
Foskett. A case of mercurial poisoning from a vaginal douche.....	639
Frank. Acute yellow atrophy of the liver in pregnancy with recovery....	1031
Cesarean section necessitated by large Gaertner's cysts.....	467
Dermoid cyst of the ovary with carcinomatous change.....	467
Intraperitoneal hemorrhage of unknown origin.....	466
The choice between operation and Röntgenization of uterine fibroids.....	408, 452
Vesicovaginal fistula, combined operation, cure.....	1032
Freeland. Serum-skin test for pregnancy and different pathological con- ditions.....	599
Funnel pelvis, statistical study of the frequency of, and the description of a new outlet pelvimeter. Thoms.....	121
Furniss. Some observations upon postoperative uterine fistulæ.....	837
Two cases of suppurative pyelonephritis following postoperative utero vaginal fistula.....	450

G

Gaarde. Involvement of the urinary tract as the result of focal infection in children.....	928
Gaertner's cysts, large, Cesarean section necessitated by. Frank.....	467
Gall-stone causing intestinal obstruction and volvulus. Hall.....	791
Galvanocautery knife, use of the, for excision of mammary tumors for microscopic diagnosis. Bovée.....	25, 709
Gas-pains. Dickinson.....	864
Gastroenterostomy for congenital pyloric stenosis, the pylorus after. Lewis and Grulee.....	201
Gayler. Developmentally deficient children twice born to same couple....	729
Geist. A case of chorioepithelioma, three and a quarter years after the last pregnancy.....	472
Gellhorn. Casein milk feedings in infancy and childhood.....	935
Gerstenberger. A further step in the adaptation of an artificial food to human milk.....	374
Gestation, and mitral disease. Longaker.....	289, 341
ectopic, some points in the diagnosis of. Harrison.....	698
Girls, precocious maturity in. Beekman.....	198
Girvin. The after-results of curetment of the uterus.....	632, 689
Glands, tuberculosis mesenteric and retroperitoneal, preoperative diagnosis of. Risley.....	207
Glioma, bilateral, of the retina. Hansell.....	941
Goddard. Syphilis as a cause of feeble-mindedness.....	763
Gonococcus vaccine, use of sensitized, in gonorrheal vaginitis. Cecil....	528
Grad. Two cases of ectopic gestation.....	1039
Griffith. Acute cerebellar ataxia in children.....	549
Grulee. Involvement of the urinary tract as the result of focal infection in children.....	928
Gynecologic and obstetric practice, some comments on present tendencies in. Bonifield.....	769
Gynecology, what has the American Gynecological Society done for? Watkins.....	702

H

Hall. Report of a case of gall-stone causing intestinal obstruction and volvulus.....	791
Hamill. Report of the committee to cooperate with the Federal Bureau. . .	560
Hand. Differential diagnosis of stenosis and spasm of the pylorus.....	561
Harrigan. Severe intraperitoneal hemorrhage of unknown origin.....	476
Harrison. Some points in the diagnosis of ectopic gestation.....	698
Hartshorn. Case of child swallowing a foreign body.....	1073
Case of meningitis with complete recovery.....	1072
Haskins. A further step in the adaptation of an artificial food to human milk.....	374
Haynes. A contribution to ductless gland therapy.....	364
Further experience in the treatment of hydrocephalus by cisterna-sinus drainage? (author's operation).....	732
Heaney. Nitrous oxid in labor.....	147
Heart disease, congenital, an unusual case of, with demonstration of specimen. Morse.....	558
disease in childhood. Tuley.....	176
rupture of the, in a child. Anderson.....	576
Hieman. Clinical distinctions between cerebral intoxication, meningism and meningitis.....	185
Parapharyngeal abscess as distinguished from retropharyngeal and peritonsillar abscess.....	360
Hemorrhage, concealed accidental. Brodhead.....	1030
intraperitoneal, of unknown origin. Frank.....	466
uterine, at and after the menopause. Cleland.....	353
Hemorrhages in children. Mills.....	1067
Hereditary syphilis: early manifestations. Kerr.....	758
syphilis: later manifestations. La Fetra.....	780
Herniæ, inguinal, unusual contents of. Moots.....	810
Herniotomy, further experiences with local anesthesia in. Jacobson.....	783
Herrman. Amaurotic family idiocy in one of twins.....	553
Hypertrophic pulmonary arthropathy in a girl of eleven years.....	1070
Immunization against measles.....	739
Meningitis in the new-born, with report of a case.....	552
Hermaphroditism, so-called true. Bell.....	1063
Hess. Antimumps inoculation.....	183
Hip disease, tuberculous. Nathan.....	576
Hirsh. Static currents of value in gynecology.....	73, 157
Holt. The composition of woman's milk.....	538
Homogenized olive oil and fat-free milk mixtures in cases of difficult feeding. Ladd.....	375
Hoobler. Energy metabolism of a two months' old child fed on a prolonged protein rich diet.....	372
Hornstein. Contracted pelvis and difficult labor.....	421
Hospital children, energy metabolism of. Murlin and Hoobler.....	207
officers, need of instructors and inspectors as. Dickinson.....	385, 445
Howland. The indications for treatment in severe diarrhea in infancy... ..	544
Hubbard. Prevention and control of scarlet fever in New York City... ..	1078

Huffaker. Mental and physical survey of supposedly normal children...	929
Huggins. The treatment of pyelonephritis in pregnancy.....	714
Hunger, onset of, in infants after feeding. Tumpowsky and Carlson.....	939
Hydatid mole, an unusual case of. McLean.....	475
Hydatidiform mole. Ford.....	333
Hydrocephalus developing after birth, relation of contracted pelvis to.	
Oden.....	566
further experience in the treatment of, by cisterna-sinus	
drainage. Haynes.....	732
Hydrogen ion concentration of the gastric and duodenal contents in child-	
hood. Sedgewick.....	559
Hydrops universalis fetus, a study of. Schumann.....	138, 961
Hygiene of the infant before birth. Pinard.....	722
Hyperemesis and other forms of pregnancy toxemia. Tweedy.....	170
Hypertrophies of the endometrium. Gardner.....	516
Hypertrophy of the thymus and thymus death. Bontillier.....	1087
Hysterectomy, fate of the ovaries left <i>in situ</i> after. Vineberg.....	144
restricted, completed by radium therapy in cancer of the uterus.	
Pozzi and Rouvier.....	727
subtotal, as a cancer-preventing measure, destruction of cervical	
mucosa in. Tyler.....	728
Hysterotomy for large submucous fibroid. Broun.....	1027

I

Icterus neonatorum considered as an infectious process. Pfaltzer.....	508
neonatorum, etiology of. Heynemann.....	511
Idiocy, amaurotic family, in one of twins. Herrman.....	553
Mongolian, and syphilis. Stephens.....	936
Impregnation, artificial, experiments in. Prochownick.....	512
Indigestion, fat, studies in. Dunn.....	567
Infant feeding, humanized milk in. Epstein.....	1087
feeding, recent observations in the use of the soy bean in. Sinclair.	751
hygiene of the, before birth. Pinard.....	722
metabolism, studies on. Courtney and Fales.....	573
mortality due to labor. Bacon.....	1055
Infantile paralysis, treatment of. Lovett.....	1090
Infantilism, renal. Porter.....	204
Infants, institutional bottle-fed, cubic air space for. Southworth.....	357
Infection, puerperal streptococcic, and antistreptococcic serum. Pazzini..	350
Infections, nontubercular renal, moot points in the etiology of. Keyes, Jr.	487
of the tonsil. Pybus.....	1086
renal, some errors in the diagnosis of. Chute.....	490
Infundibulin in primary uterine inertia and in induction of labor. Bell..	1059
Inguinal herniæ, unusual contents of, with report of a case. Moots.....	810
Inorganic and organic phosphorus preparations in the treatment of rickets.	
Schloss.....	196
Institutional mortality of the new-born. Holt and Babbitt.....	200
Instructors and inspectors, the need of, as hospital officers. Dickinson.	

Intestinal flora, biological examination of the, in infants. Bluhdorn....	568
obstruction and volvulus, gall-stone causing. Hall.....	791
stasis, newer conceptions of. Crile.....	861
Intranasal treatment of dysmenorrhea. O'Reilly.....	634, 688
Intraperitoneal hemorrhage of unknown origin. Frank.....	466
hemorrhage, severe, of unknown origin. Harrigan.....	476
Intrauterine manipulations during labor, influence of, on the morbidity and mortality after labor. Groot.....	723
Intussusception. Cubbins.....	199
Inversion of the uterus with report of a case of complete inversion with prolapse. Kirkham.....	312
Ionization method for the treatment of carcinoma of the cervix. Massey	56, 157

J

Jacobson. Further experiences with local anesthesia in herniotomy.....	783
Judd. Sterility, its causes and its treatment with an original stem pessary. X-ray diagnosis of pregnancy.....	678 319

K

Keefe. The surgery of the appendix.....	821
Kelley's method of cystoscopy in women, advantage of. Vineberg.....	488
Kerr. Hereditary syphilis: the early manifestations, starting from intra-uterine life up to one year of age	759
Keyes, Jr. Moot points in the etiology of nontubercular renal infections. Primary (celoic) prolapse of the vagina, with (traction) elongation of the cervix versus prolapse of the uterus, either primary nulliparous, primary or combined parous; or purely secondary.....	487 663
Kidney tests, functional, in pregnancy. Orlovius.....	1063
unilateral impairment of the, in the toxemia of pregnancy. Buschmann.....	624, 685
Kirkham. Inversion of the uterus with report of a case of complete inversion with prolapse.....	312
Knox. Myelogenous leukemia in an infant nine months old.....	559
Kolmer. A study of the specificity of ferments in pregnancy and the mechanism of the Abderhalden reaction.....	101
Koplik. The etiologic relationship of syphilis to chorea of sydenham.....	547

L

Labor, difficult, and contracted pelvis. Hornstein.....	421
episiotomy in the second stage of. Anspach.....	711
induction of, by Baumm's method. Szenasy.....	510
infant mortality due to. Bacon.....	1059
influence of intrauterine manipulations during. Groot.....	723
infundibulin in induction of. Bell.....	1059
nitrous oxid in. Heaney.....	147

Labor, pregnancy and the puerperium, energy measurements in.	Bigler...	1062
scopolamin-morphine treatment in.	Baer.....	506
study of the management of the placental stage of.	Polak.....	150
the diagnosis of uni- or bioval twins before and during.	Ahlfeld....	512
Ladd. Homogenized olive oil and fat-free milk mixtures in cases of diffi-		
cult feeding.....		375
LaFetra. Hereditary syphilis: later manifestations after the age of one		
year.....		780
Larson. Epidemic abortion reactions in children.....		925
Larynx and trachea, condition of the, in the stillborn infant and its bearing		
on artificial respiration.	Barton.....	1089
Leighton, Jr. The use of luteum extract in the treatment of menstrual		
disorders.....		878
Lesions, inflammatory, of the adnexa and pregnancy.	Ferroni.....	351
Leukemia, chronic lymphatic, treated with benzol.	Rolleston.....	202
lymphatic, benzol treatment of.	Meyers.....	570
myelogenous, in an infant nine months old.	Knox.....	559
Leukocyte counts during digestion in bottle-fed infants.	Mitchell.....	938
Lipoids, on the histology of the uterine mucosa with reference to the pres-		
ence of lipoids.	Aschheim.....	1061
Lithopedion, extrauterine.	Maier.....	1054
Liver, acute yellow atrophy of the, in pregnancy, with recovery.....		1031
Longaker. Mitral disease and gestation.....		289 341
Lott. Drainage and dressing.....		612
Lucas. The problem of unresolved pneumonia in infancy and childhood.		916
Luteum extract, use of, in the treatment of menstrual disorders.		
Leighton, Jr.....		878
Lymphatic leukemia, benzol treatment of.	Meyers.....	570
chronic, treated with benzol.	Rolleston.....	202

M

McCarthy. Psychoses and neuroses of pregnancy and the puerperium.	269, 337
The neuroses and psychosis of pregnancy and the puerperium. . . .	337
McClanahan. Practical value of the examination of stools in infancy. . .	913
McClellan. Atypical chorioepithelioma.	1014
Macewen's sign. Wilcox.	555
McGregor. A further step in the adaptation of an artificial food to human milk.	374
McLean. An unusual case of hydatid mole.	475
Magnesium sulphate, excretion of. Courtney and Fales.	573
Maier. Extrauterine lithopedion.	1054
Malignant uterine myoma. Lahm.	1062
Malt soup, experiments with, for institution marasmus. Southworth. . . .	749
Mammary secretion, origin of the stimulus of the. Zuloaga.	1060
tumors, use of the galvanocautery knife for excision of, for micro- scopic diagnosis. Bovée.	25
Management of children between one and two years of age. Freeman. . . .	767
Marasmus, institution, experiments with malt soup for. Southworth. . .	749
Marriott. The indications for treatment in severe diarrhea in infancy. .	544

Martin. Ovarian transplantation.....	140
Massey. An improved ionization method for the treatment of carcinoma of the cervix; sinusoidal galvanic reversal current in enteroptosis and pelvic relaxations; two new electrical methods in gynecology.....	56, 157
Maturity, precocious, in girls. Beekman.....	198
Measles, immunization against. Herrmann.....	739
Measures taken by the French government to assist women violated by German soldiers. Bar.....	514
Meeker. A contribution to the conservative surgery of chronic intestinal stasis.....	981
Megalocolon and microcolon. Porter and Weeks.....	572
Meningitis, a case of, with complete recovery. Hartshorn.....	1072
cerebrospinal, during the Texas epidemic. Bardin.....	925
epidemic cerebrospinal, treated with Flexner's antimeningitis serum. Smith.....	768
in the new-born, with report of a case. Herrman.....	552
meningism and cerebral intoxication, clinical distinctions between. Heiman.....	185
Menopause, uterine hemorrhage at and after the. Cleland.....	353
Menstrual disorders, remove the uterus instead of the ovaries for incurable cases of. Carstens.....	852
disorders, the use of luteum extract in the treatment of. Leighton, Jr.....	878
irregularities, logical interpretation of. Clark.....	341
Menstruation, influence of, on breast milk. Grulee and Caldwell.....	768
reappearance of, after childbirth. Ehrenfest.....	577
Mental and physical survey of supposedly normal children. Porter, Huf-faker and Ritter.....	929
Mercurial poisoning, a case of, from a vaginal douch. Foskett.....	639
Mesenteric thromboses. Darnall.....	848
Metabolism, energy, of a two months' old child fed on a prolonged protein rich diet. Hoobler.....	372
pathologic, in the parental organism; is it responsible for defective and monstrous development of the offspring? Weber.....	507
Metroendometritis, chronic, or fibrosis and marked interstitial salpingo-oophoritis. Boldt.....	1039
Microcolon and megalocolon. Porter and Weeks.....	572
Middle ear, infection of, with Vincent's organisms. Adam.....	203
Milk, breast, influence of menstruation on. Grulee and Caldwell.....	768
feedings, casein, in infancy and childhood. Gellhorn.....	935
humanized, in infant feeding. Epstein.....	1087
Report of cases of various types of idiosyncrasy to. Saunders and White.....	369
woman's, composition of. Holt.....	538
Miller. The relation of albuminuric retinitis to the toxemias of pregnancy.	253
Mills. Hemorrhages in children.....	1067
"Missed labor," so-called, two cases of. Warren.....	603
Mitral disease and gestation. Longaker.....	289, 341
Mongolian idiocy and syphilis. Stevens.....	939

Monstrous development of the offspring, is pathologic metabolism in the parental organism responsible for? Weber.....	507
Montgomery. The etherometer, a means for mechanical anesthesia.....	133
Moot points in the etiology of nontubercular renal infections. Keyes, Jr..	487
Moots. Unusual contents of inguinal herniæ, with report of a case.....	810
Morbidity and mortality after labor, influence of intrauterine manipulations during labor on the. Groot.....	723
Morse. An unusual case of congenital heart disease, with demonstration of specimen.....	558
The treatment of the disturbances of digestion in infancy.....	746
Mosher. Nitrous oxide-oxygen anesthesia.....	1055
Mucosa, cervical, destruction of, in subtotal hysterectomy as a cancer-preventing measure. Tyler.....	728
Myelogenous leukemia in an infant nine months old. Knox.....	559
Myofibroma complicating pregnancy, an unusual case of. Bell.....	1002
Myoma, malignant uterine. Lahm.....	1062
Myositis ossificans, early development of. Weber and Compton.....	194

N

Narcosis, scopolamin-morphine, American statistics on; report of 1000 cases of labor. Beach.....	480
Nasal sinuses, accessory, diseases of the, in the first year of life. Onodi..	384
Neff. Recent methods on treating diphtheria.....	909
Nephrectomy during pregnancy. Harrigan.....	507
Nervous cretinism. McCarrison.....	195
Neurologist, the mentally backward child from the standpoint of the. Neustraedter.....	521
Neustraedter. The mentally backward child from the standpoint of the neurologist.....	521
New-born, institutional mortality of the. Holt and Babbitt.....	200
Nipple, Paget's disease of the, and allied conditions. Jopson and Speese..	1065
Nitrogen, forms of, in the stools of infants. Van Slyke, Courtney and Fales.	941
Nitrogenous elements in new-born. Schultz and Pettibone.....	924
Nitrous oxide analgesia in obstetrics versus scopolamin-morphine seminar-cosis. Lynch.....	171
oxide in labor. Heaney.....	147
oxide-oxygen anesthesia. Mosher.....	1055
Noguchi. Bacteria-free vaccine.....	531
Nonprotein nitrogen and the urea of the blood. Tileston.....	377
Northrup. General tuberculosis in a child including the skin.....	554
Norton. Tuffier's ovarian graft.....	620
Nutritive value of proprietary infant foods. Wheeler.....	573
Nuts and fruits, their value in the diet of children. Scott.....	757

O

Oastler. Three cases of extrauterine pregnancy.....	1044
Observations on the treatment of dysmenorrhea. Block.....	945, 1046
Oculo-cardiac reflex. Gunson.....	574

Oophorectomy, bilateral, Cesarean section following primary section with.	
Brodhead.....	1030
Operation, Alexander-Adams, and its results. Madill.....	1063
disinfection of the hands and abdominal skin before. McDonald..	724
radical, limitations of the, for cervical cancer of the uterus.	
Hutchins.....	1066
Operative treatment of cleft palate. Blakeway.....	571
O'Reilly. Observations on the intranasal treatment of dysmenorrhea..	634 688
Outerbridge. Sweat-gland tumors of the vulva (adenoma hidradenoides vulvæ).....	32
The occurrence of chorioepithelioma following a long period of latency after the last preceding pregnancy.....	952, 1049
Outlet pelvimetry. Pierce.....	652
Outraged woman, victim of war. Herrgott.....	724
Ovarian cysts, double multilocular and contracted pelvis, Cesarean sec- tion for. Brodhead.....	478
dermoids, bilateral, early pregnancy complicated by. Broun....	1026
fibroids. Hellman.....	518
graft, Tuffier's. Norton.....	620
transplantation. Martin.....	140
transplantation, effect of.....	509
tumors, a study of the complications of. Wiener.....	210
Ovaries left <i>in situ</i> after hysterectomy. Vineberg.....	144
Ovary, dermoid cyst of the, with carcinomatous change. Frank.....	467
echinococcal invasion of the. Young.....	353
the influence of, on the growth of the uterus. Mayer.....	1062
primary syngioma of the. Ries.....	46

P

Paget's disease of the nipple and allied conditions. Jopson and Speese...	1065
Palate, cleft, operative treatment of. Blakeway.....	571
Pantzer. A prognostic sign in acute suppurative peritonitis.....	826
Paradimethylamidobenzaldehyde reaction of Ehrlich in the urine of scar- latina, measles and diphtheria of children, and various mixed infections. Rachmilewitsch.....	383
Paraffin, liquid, emulsions of, and castor oil in treatment of certain types of chronic dyspepsia in childhood. McNeil.....	202
liquid, use of, in infants. Hill.....	205
Paralysis, cerebral spastic, operative treatment for selected cases of. Sharpe and Farrell.....	200
diphtheritic, and diphtheria antitoxin. Kleinschmidt.....	571
infantile, treatment of. Lovett.....	1090
Parametrium, distribution and significance of the. Moritz.....	173
Parapharyngeal abscess as distinguished from retropharyngeal and peri- tonsillar abscess. Heiman.....	360
Parapneumonic empyema in children. Gerhardt.....	569
Parathyroids, study of the. Thinn.....	197
Parke. The Cesarean operation; its wider applications; with report of cases.....	281, 340

Par-obstetrical motility troubles. Gautiez and Tissier.....	514
Pediatrician and the section on diseases of children. Royster.....	908
Pellagra in childhood. Knowles.....	943
Pelves, funnel, statistical study of the frequency of. Thoms.....	121
Pelvic inflammation of tubal origin, a safe time for operation in. Simpson.	693
relation of, to abdominal surgery. Wetherill.....	615
varicocele. Pinkham.....	244, 323
Pelvimeter, new outlet, the description of. Thoms.....	121
Pelvimetry, outlet. Pierce.....	652
Pelvis, contracted, and difficult labor. Hornstein.....	421
contracted, and double multilocular ovarian cysts, Cesarean section	
for. Brodhead.....	478
contracted, and fibroid uterus, Cesarean section with hysterectomy	
for. Brodhead.....	478
contracted, relation of, to hydrocephalus developing after birth.	
Oden.....	566
the coxalgic. Briggs.....	172
Percy cautery, use of, in carcinoma uteri. Clark.....	516
The technic of applying heat in the treatment of inoperable uterine	
carcinoma.....	298, 345
Perineal condylomata during pregnancy. Williams.....	1051
Perinephritic abscess. Richardson.....	725
Peritoneal exudates, character, significance, and prognostic value of.	
Carslaw.....	1064
Peritonitis, acute suppurative, a prognostic sign in. Pantzer.....	826
diffuse, septic. Bruce.....	354
Pessary, original stem, sterility, its causes and its treatment with an.	
Judd.....	678
Pettibone. Quantitative determinations of nitrogenous elements in new-	
born.....	924
Pfaff. Fibroid tumor completely obstructing uterine canal; dead fetus long	
retained without infection.....	1018
Pfahler. Röntgenotherapy in uterine fibroids and uterine hemorrhage.	
79, 157, 793	
Phenosulphonaphthalein excretion in infancy and childhood. Tileston..	377
Phosphorus preparations, inorganic and organic, in the treatment of	
rickets. Schloss.....	196
Phylogenetic significance of the female genital passages. Wichmann....	175
Physiological and pathological results of direct abdominal hysteropexy.	
Muret.....	1065
Pierce. Outlet pelvimetry; with the description of a new pelvimeter for	
measuring the transverse and posterior sagittal diameters of the	
pelvic outlet when the transverse is between 8 and 5.5 cm. in	
width.....	652
Pinkham. A case of visceroptosis with result of operation.....	321
Pelvic varicocele.....	244, 323
Pisek. A preliminary report on the pneumonias in children, with special	
reference to its epidemiology.....	556
Pituitary extract in obstetrics. Rowland.....	172
Placenta, action of extracts of the. Colle.....	512

Placenta, case of cervical implantation of. Tiegel.....	1061
normally situated, separation of the, with eclampsia and utero-placental apoplexy. Zarate.....	353
previa, treatment of. Stratz.....	510
Placentæ, retained and adherent; their management. Polak.....	483
Placental fats. Santoro.....	721
stage of labor, study of the management of the. Polak.....	150
Plea for accurate statistics in infant's institutions. Chapin.....	539
Pneumonia, a clinical study of, in infants. Chapin.....	915
in children, can it be aborted? Clarke.....	753
unresolved, problem of, in infancy and childhood. Lucas.....	916
Pneumonias, foreign body. Caillè.....	550
in children, preliminary report on, with special reference to its epidemiology. Pisek.....	556
Polak. A study of the management of the placental stage of labor, with special reference to retained and adherent placenta.....	150
Retained and adherent placenta; their management.....	483
Poliomyelitis, epidemic, mode of infection and etiology of. Flexner.....	938
Porter. Mental and physical survey of supposedly normal children.....	929
Some studies on sugar in infant feeding.....	542
Pott's disease, bony ankylosis of the spine in. Halstead.....	944
Precocious maturity in girls. Beekman.....	198
Pregnancy, acute yellow atrophy of the liver in, with recovery. Frank.....	1031
ampullar. Wiener.....	469
an unusual case of myofibroma complicating. Bell.....	1002
and adnexa, inflammatory lesions of. Ferroni.....	351
and different pathological conditions, serum-skin test for. Bronfenbrenner, Freeland and Schlesinger.....	599
and sterilization, the combined operation for the interruption of. Findley.....	1022
and the puerperium, the neuroses and psychosis of. McCarthy.....	337
arterial tension and blood viscosity in, and their relations. Pellissier.....	515
a study of the specificity of ferments in. Kolmer and Williams.....	101
chorioepithelioma following a long period of latency after the last preceding. Outerbridge.....	952, 1049
diagnosis of. Malone.....	170
early, complicated by bilateral ovarian dermoids. Broun.....	1026
extrauterine, three case of. Oastler.....	1044
functional kidney tests in. Orlovius.....	1063
influence of adrenalin on the blood condition in. Aymerich.....	720
in the rudimentary horn of an atresic bicornuate uterus. Pintor.....	172
in the rudimentary horn of a uterus bicornis. Maceabruni.....	1060
labor, and the puerperal state, undulating fever in its relations to. Lafont.....	352
labor and the puerperium, energy measurements in. Bigler.....	1062
nephrectomy during. Harrigan.....	507
perineal condylomata during. Williams.....	1051
psychosis and neuroses of. McCarthy.....	269, 337
relation of albuminuric retinitis to the toxemias of. Miller.....	253

Pregnancy, serodiagnosis of, with the method of colored substratum. Ceola	513
serum studies in. Kolmer and Williams.....	101
stomach in. Bacialli.....	514
the treatment of pyelonephritis in. Huggins.....	714
toxemia, hyperemesis and other forms of. Tweedy.....	170
twin, the intolerance of a fibroid uterus to. Montuoro.....	508
unilateral impairment of the kidney in the toxemia of. Buschmann.	624, 685
x-ray diagnosis of. Judd.....	319
Prolapse, complete inversion with. Kirkham.....	312
primary of the vagina. Keyes.....	663
Proteolytic ferments in patients injected with antidiphtheritic serum.	
Reisz and Barabàs.....	936
Pryor. A preliminary report on the Rollier treatment for so-called surgical tuberculosis.....	755
Psychoses and neuroses of pregnancy and the puerperium. McCarthy.	269, 337
Pubiotomy, the effect of, upon the course of subsequent labors. Williams.	1
Puerperal streptococcic infection and antistreptococcic serum. Pazzini..	350
Pulmonary arthropathy, hypertrophic, in a girl of eleven years. Hermann.	1070
Pulse, dynamic, examination of children and adults. Hotz.....	937
Pyelitis, acute. Wood.....	570
its clinical significance. Wynkoop.....	740
Pyelonephritis, treatment of, in pregnancy. Huggins.....	714
Pyloric spasm and pyloric stenosis, diagnosis and treatment of. Dunn	
and Howell.....	1091
stenosis and pyloric spasm, diagnosis and treatment of. Dunn and	
Howell.....	1091
Pylorus after gastroenterostomy for congenital pyloric stenosis. Lewis and	
Grulee.....	201
stenosis and spasm of the. Hand.....	561

R

Rabinoff. Prophylactic vaccination for varicella.....	526
Radium in gynecological practice. Chase.....	90
therapy, restricted hysterectomy completed by, in cancer of the	
uterus. Pozzi and Rouvier.....	727
Rays, hard, technic and experimental application of, for deep Röntgeno-	
therapy. Cole.....	705
Renal and ureteral calculus, errors in diagnosis of. Cabot.....	495
condition, significance of vesical symptoms in the diagnosis of.	
Braasch.....	500
infantilism. Porter.....	204
infection, postoperative. Ward.....	501
infections, nontubercular, moot points in etiology of. Keyes, Jr..	487
infections, some errors in the diagnosis of. Chute.....	490
pain; diagnostic and clinical significance. Squier.....	496
Retina, bilateral glioma of the. Hansell.....	941
Retinitis, albuminuric, relation of, to the toxemias of pregnancy. Miller.	253

Retroperitoneal glands, preoperative diagnosis of. Risley.....	207
Retropharyngeal and peritonsillar abscess, distinguished from, parapharyngeal abscess. Heiman.....	360
Reviews: Bacon. Obstetrical nursing.....	166
Blakiston. The physician's visiting list for 1916.....	1058
Cabot. Physical diagnosis.....	1057
Cameron. A manual of gynecology for students and practitioners.....	719
Crile. A mechanistic view of war and peace.....	1057
Dana. Text-book of nervous diseases for the use of students and practitioners of medicine.....	1056
Falta. The ductless glandular disease.....	716
Glaister. Text-book of medical jurisprudence and toxicology.....	349
Hellman. Amnesia and analgesia in parturition.....	718
Kerley. What every mother should know about her infants and young children.....	1058
Lewis. Cystoscopy and urethroscopy for general practitioners...	167
Mathews. Physiological chemistry.....	1056
Metheny. Potter's compend of human anatomy.....	1058
Stedman. A reference handbook of the medical sciences.....	165
Tracy and Boyd. Painless childbirth.....	167
Van Hoosen. Scopolamine-morphine anesthesia.....	718
Wood. International medical annual.....	350
Wood. The Medical Record visiting list for 1916.....	1058
Rheumatism, chronic, of children, bee-stings and bee-poison as a therapeutic measure in. Langer.....	565
Rickets, action of inorganic and organic phosphorus preparations in the treatment of. Schloss.....	196
sex distribution in. Priestley.....	1087
Ries. Primary synechia of the ovary.....	46
Ritter. Mental and physical survey of supposedly normal children.....	929
Rollier treatment for so-called surgical tuberculosis. Pryor.....	755
Rongy. The present status of twilight sleep in obstetrics, based upon a collection study of over 2000 cases.....	888
Röntgenotherapy in uterine fibroids and uterine hemorrhage. Pfahler.	79, 157, 703
Royster. The pediatrician and the section on diseases of children.....	908
Ruh. A further step in the adaptation of an artificial food to human milk.	374
Rupture of the heart in a child. Anderson.....	576
spontaneous and traumatic, of the dura mater in the new-born.	
Moreno.....	506

S

Salvarsan, action of, on the fetus. Meyer.....	508
in the therapeutics of childhood. Boutillier.....	199
Saunders. Report of cases of various types of idiosyncrasy to milk.....	369
Scarlatina: morbidity and case fatality, by locality, sex, age and season.	
Donnally.....	1075
some unusual and severe types. Berg.....	1074
Scarlet fever, prevention and control of, in New York City. Hubbard...	1078
Schick reaction. Bundesen.....	765
reaction and its practical application. Zingher.....	735

Schick reaction, test, results of the, at the Rochester Orphan Asylum. Bullen	735
toxin reaction for immunity in diphtheria. Kolmer and Moshage.	567
Schildecker. On the use of sodium citrate for direct blood transfusion...	858
Schlesinger. Serum-skin test for pregnancy and different pathological conditions.....	599
Schloss. Allergy to common foods.....	367
The reducing substance in spinal fluid.....	548
Schroeder. The reducing substance in spinal fluid.....	548
Schultz. Quantitative determinations of nitrogenous elements in new-born.....	924
Schumann. A study of hydrops universalis fetus, with the report of a case.....	138, 961
Schwarz. A case of chorioepithelioma uteri with large bilateral luteincystomata of the ovary.....	645
Scleroderma of the new-born. Mayerhofer.....	937
Scopolamin-morphine seminarcosis versus nitrous oxide analgesia in obstetrics. Lynch.....	171
-morphine treatment in labor. Baer.....	506
Scott. Nuts and fruits: their value in the diet of children.....	757
Sedgwick. Epidemic abortion reactions in children.....	925
The hydrogen ion concentration of the gastric and duodenal contents in childhood.....	559
Serum anaphylaxis in men. Bessau.....	206
antistreptococcus, and puerperal streptococcic infection. Pazzini..	350
-skin test for pregnancy and different pathological conditions. Bronfenbrenner, Freeland and Schlesinger.....	599
studies in pregnancy. Kolmer and Williams.....	101
therapy in diphtheria. Knospel.....	206
therapy of epidemic cerebrospinal meningitis in childhood. Helmick.....	203
Sex distribution in rickets. Priestley.....	1087
Shaw. Blood coagulation in infancy.....	744
Sherman. Some interesting facts plainly brought out by a chart method of studying and managing cases of diabetes mellitus in children..	561
Shoemaker. Report of cases illustrating three types of ectopic gestation..	632
Shoulder presentations. Astley.....	294
Sigmoid, a rare congenital abnormality of the. Van Sweringen.....	832
Simpson. A precise method of choosing a safe time for operation in pelvic inflammation of tubal origin.....	693
Sinclair. Recent observations in the use of the soy bean in infant feeding.	751
Sodium citrate, use of, for direct blood transfusion. Schildecker.....	858
Soresi. The surgical treatment of disease of the stomach in children....	189
Southworth. Cubic air space for institutional bottle-fed infants.....	357
Experiments with malt soup for institution marasmus.....	749
Soy bean, recent observations in the use of the, in infant feeding. Sinclair.	751
Spasmophilia, remote results of calcium treatment of. Rohmer.....	382
Spinal canal, lavage of the, in cerebrospinal meningitis. Aubertin and Chabanier.....	943
disease, tuberculous, bone transplantation for the cure of. Jacobs.	199
fluid, reducing substance in. Schloss and Schroeder.....	548
Squamous cell cancer of the cervix. Boldt.....	1038

Squier. Renal pain; diagnostic and clinical significance.....	496
Starch digestion in children. Yerrington and Wetmore.....	932
Stasis, chronic intestinal, a contribution to the conservative surgery of.	
Meeker.....	981
intestinal, newer conceptions of. Crile.....	861
Static currents of value in gynecology. Hirsh.....	73, 157
Statistics, accurate, a plea for, in infant's institutions. Chapin.....	539
Steele. Experiences with vaccines at the Massachusetts General Hospital.	535
Stenosis and spasm of the pylorus, differential diagnosis of. Hand.....	561
Sterility, its causes and its treatment with an original stem pessary. Judd.	678
Stern. X-ray treatment of uterine fibroids.....	396, 452
Stimulus of the mammary secretion, origin of. Zuloaga.....	1060
Stomach, infant's, use of Bismuth pills in the fluoroscopic examination	
of the. Hess.....	940
in pregnancy. Bacialli.....	514
surgical treatment of disease of the, in children. Soresi.....	189
Stools, infants; ammonia and urea content of. Gamble.....	942
of infants, forms of nitrogen in. Van Slyke, Courtney and Fales..	941
practical value of the examination of, in infancy. McClanahan...	913
Strong. Carcinoma uteri.....	431, 700
Submucous fibroid, large, hysterotomy for. Brown.....	1027
Subsequent labors, the effect of pubiotomy upon the course of. Williams.	1
Substratum, colored, serodiagnosis of pregnancy with the method of.	
Ceole.....	513
Sugar in the blood and eclampsia. Wieden.....	510
some studies on, in infant feeding. Dunn and Porter.....	542
Suppurative pyelonephritis following postoperative uterovaginal fistula.	
Furniss.....	450
Surgery of the appendix. Keefe.....	821
Surgical treatment of disease of the stomach in children. Soresi.....	189
Sweat-gland tumors of the vulva (adenoma hidradenoides vulvæ).	
Outerbridge.....	32
Swope. Cholecystectomy versus cholecystostomy.....	803
Sydenham, etiological relationship of syphilis to chorea of. Koplik.....	547
Synctioma, primary, of the ovary. Ries.....	46
Syphilis as a cause of feeble-mindedness. Goddard.....	763
congenital, prevalence of, among the newly born of the east end of	
London. Fielders.....	1089
etiological relationship of, to chorea of. Sydenham.....	547
hereditary: early manifestations. Kerr.....	758
hereditary: later manifestations. La Fetra.....	780
in children. Hallopeter.....	198
Mongolian idiocy and. Stephens.....	939

T

Talbot. The energy metabolism of an infant with congenital absence of	
the cerebral hemispheres.....	366
Taussig. Bladder function after confinement and after gynecological	
operations.....	503
Technic of applying heat in the treatment of inoperable uterine carcinoma.	
Percy.....	298, 345

Therapeutics of childhood, salvarsan in the. Boutillier.....	199
Thoms. A statistical study of the frequency of funnel pelves and the description of a new outlet pelvimeter.....	121
Thorax, empyema of the. Wilensky.....	942
Thromboses, mesenteric. Darnall.....	848
Thymus and thymus death, hypertrophy of the. Bontillier.....	1087
Tileston. The total nonprotein nitrogen and the urea of the blood, and the phenosulphonephthalein excretion in infancy and childhood.	377
Tonsil, infections of the. Pybus.....	1086
Toxemias of pregnancy, relation of albuminuric retinitis to the. Miller..	253
Transfusion, blood, in infants and young children. Robertson and Brown.	575
Transplantation, ovarian. Martin.....	140
Treatment of advanced carcinoma of the cervix with radium. Anspach..	97
Tubal abortion and chronic appendicitis. Boldt.....	1039
Tubercle bacillus, frequency of infection with the, in childhood. Veeder and Johnston.....	940
Tuberculin tests in children of Colorado. Cattermole.....	920
Tuberculosis as a disease in the new-born. Grulee and Harms.....	575
general, in a child including the skin. Northrup.....	554
of the urachus. Eastman.....	640
pathological anatomy of, in children. Ghon.....	564
so-called surgical, preliminary report on the Rollier treatment for. Pryor	755
Tuberculous hip disease. Nathan.....	576
mesenteric and retroperitoneal glands, preoperative diagnosis of. Risley.....	207
spinal disease, bone transplantation for the cure of. Jacobs.....	199
Tuffier's ovarian graft. Norton.....	620
Tuley. Heart disease in childhood.....	176
Tumor, ovarian, report of, the size of a fetal head, composed of thyroid tissue. Baldwin.....	328
Tumors, mammary, use of the galvanocautery knife for excision of, for microscopic diagnosis. Bovée.....	709
ovarian, complications of, a study of the. Wiener.....	209, 330
sweat-gland, of the vulva. Outerbridge.....	32
Twilight sleep, present status of, in obstetrics. Rongy.....	888
Twins, uni- or bioval, diagnosis of, before and during labor. Ahlfeld....	512
Thyroid tissue, ovarian tumor, the size of a fetal head, composed of. Baldwin.....	328

U

Unilateral impairment of the kidney in the toxemia of pregnancy. Buschmann.....	624, 685
Unresolved pneumonia in infancy and childhood. Lucas.....	916
Urachus, tuberculosis of the. Eastman.....	640
Ureteral and renal calculus, errors in diagnosis of. Cabot.....	495
calculi. Geraghty and Hinman.....	516
fistulæ, postoperative, some observations upon. Furniss.....	837
Urethra, female, primary cancer of the. Crossen.....	153
Urethral caruncle. Young.....	518
Urethralgia; cystalgia. Roth.....	726

- Urinary tract, involvement of the, as the result of focal infection in children. Grulee and Gaarde..... 928
- tract in women, chronic infections of the. Curtis..... 493
- Uteri, carcinoma. Strong..... 431, 700
- carcinoma, use of the Percy cautery in. Clark..... 517
- chronic fibrosis, associated with, vaginal subtotal hysterectomy for procidentia and large cystoectoce. Vineberg..... 462
- Uterine canal, fibroid tumor completely obstructing. Pfaff..... 1018
- carcinoma, inoperable, technic of applying heat in the treatment of.
- Percy..... 298, 345
- fibroids and uterine hemorrhage, röntgenotherapy in. Pfahler... 79, 157
- fibroids, the choice between operation and röntgenization of.
- Frank..... 408, 452
- fibroids, x-ray treatment of. Stern..... 396, 452
- hemorrhage and uterine fibroids, röntgenotherapy in. Pfahler... 703
- hemorrhage at and after the menopause. Cleland..... 353
- inertia, primary, infundibulin in. Bell..... 1059
- mucosa, on the histology of the, with reference to the presence of lipoids. Aschheim..... 1061
- myoma, malignant. Lahm..... 1062
- Uterovaginal fistula, postoperative, two cases of suppurative pyelonephritis following. Furniss..... 450
- Uterus, atresic bicornuate, pregnancy in the rudimentary horn of. Pintor. 172
- bicornis, pregnancy in the rudimentary horn of a. Maceabruni... 1060
- cancer of, abdominal hysterectomy for. Maurer..... 519
- fibroid, and contracted pelvis, Cesarean section with hysterectomy.
- Brodhead..... 478
- fibroid, intolerance of a, to twin pregnancy. Montuoro..... 508
- inversion of the. Kirkham..... 312
- observations on malignancy of the. Werder..... 995
- remove the, instead of the ovaries for incurable cases of menstrual disorders. Carstens..... 852
- restricted hysterectomy completed by radium therapy in cancer of the. Pozzi and Rouvier..... 727
- the after-results of curetment of the. Girvin..... 632, 689
- the influence of the ovary on the growth of the. Mayer..... 1062

V

- Vaccination, prophylactic, for varicella. Rabinoff..... 526
- protective, for varicella. Handrick..... 382
- Vaccine, bacteria-free. Noguchi..... 531
- sensitized gonococcus, use of, in gonorrheal vaginitis. Cecil..... 528
- Vaccines, experiences with, at the Massachusetts General Hospital.
- Steele..... 535
- Vagina, primary prolapse of the. Keyes..... 663
- Vaginal douche, a case of mercurial poisoning from a. Foskett..... 639
- subtotal hysterectomy for procidentia and large cystoectoce, associated with chronic fibrosis uteri. Vineberg..... 462
- Vaginitis, gonorrheal, use of sensitized gonococcus vaccine in. Cecil..... 528
- Van der Bogert. The remote effects of bad feeding..... 742
- Van Ingen. Report of committee on child labor problem..... 560

Van Sweringen. A rare congenital abnormality of the sigmoid.....	832
Varicella, prophylactic vaccination for. Rabinoff.....	526
protective vaccination for. Handrick.....	382
Varicocele, pelvic. Pinkham.....	244, 323
Vesicovaginal fistula, combined operation, cure. Frank.....	1032
Vincent's organisms, infection of middle ear with. Adam.....	203
Vineberg. The advantage of Kelly's method of cystoscopy in women....	488
Vaginal subtotal hysterectomy for procidentia and large cystorecto- cele, associated with chronic fibrosis uteri.....	462
What is the fate of the ovaries left <i>in situ</i> after hysterectomy?....	144
Viscera, transposition of, in an infant. Adams.....	381
Visceroptosis, a case of, with result of operation. Pinkham.....	321
Viscosity, blood, and arterial tension, in pregnancy and their relations. Pellissier.....	515
Voice sign in chorea. Swift.....	205
Volvulus, gall-stone causing. Hall.....	791
Vulva, sweat-gland tumors of the. Outerbridge.....	32

W

Ward. Postoperative renal infection.....	501
Warren. Two cases of so-called "missed labor" with discussion.....	603
Watkins. What has the American Gynecological Society done for gynecology?.....	702
Werder. Observations on malignancy of the uterus. Demonstration of specimens.....	995
Wetherill. The relation of pelvic to abdominal surgery.....	615
Wetmore. Starch digestion in children.....	932
White. Report of cases of various types of idiosyncrasy to milk.....	369
Wiener. Ampullar pregnancy.....	469
A study of the complications of ovarian tumors.....	209, 330
Wilcox. Macewen's sign. An analysis of the anatomical conditions which enter into the production of this sign and the value of its presence in diagnosing changes in intracranial pressure.....	555
Williams. A study of the specificity of ferments in pregnancy and the mechanism of the Abderhalden reaction.....	101
Blood coagulation in infancy.....	744
Perineal condylomata during pregnancy.....	1051
The effect of pubiotomy upon the course of subsequent labors.....	1
Woman, outraged, victim of war. Herrgott.....	724
Wynkoop. Pyelitis; its clinical significance.....	741

X

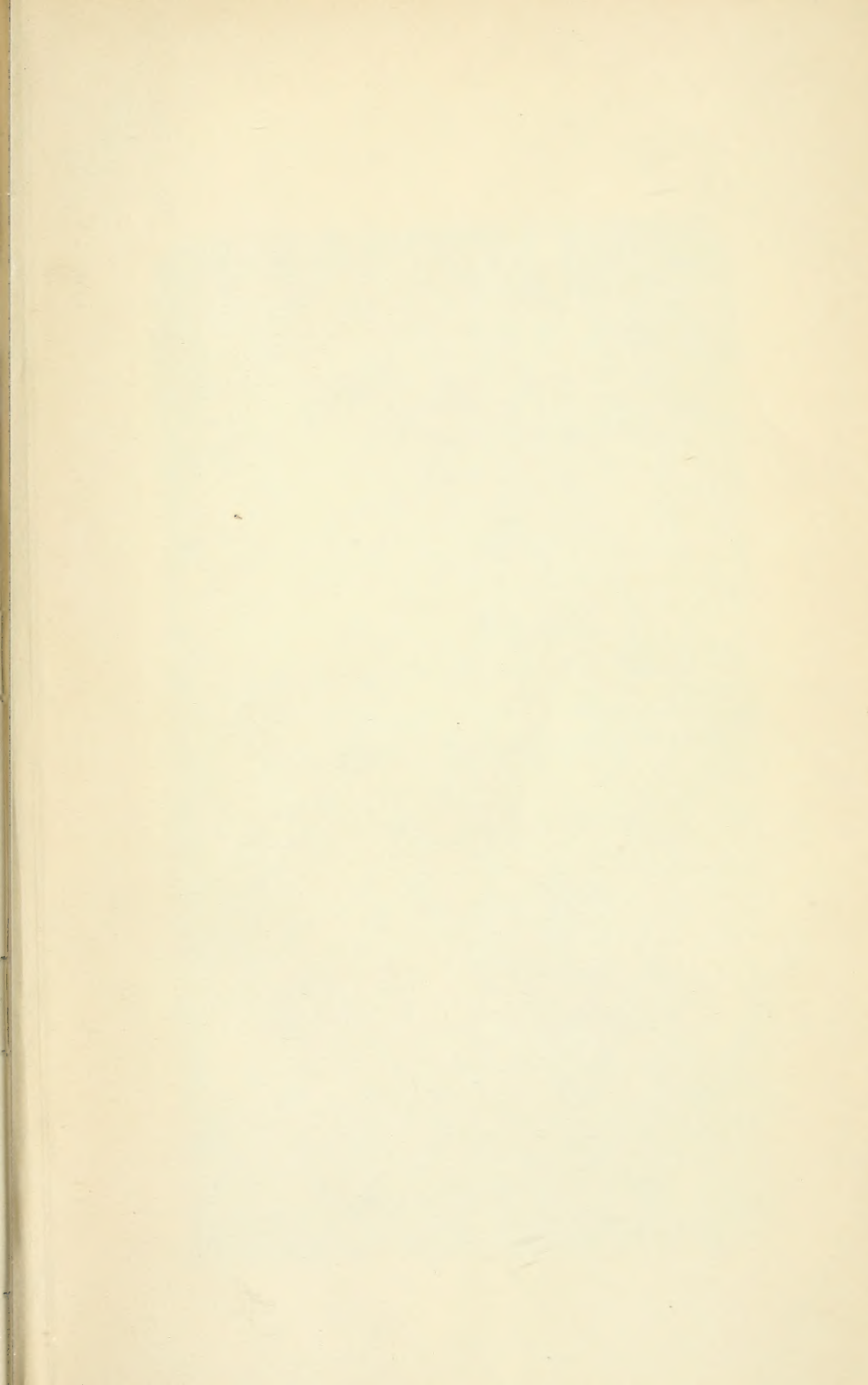
X-ray diagnosis of pregnancy. Judd.....	319
treatment of uterine fibroids. Stern.....	396, 452

Y

Yerrington. Starch digestion in children: with some clinical observations.	932
--	-----

Z

Zinger. The Schick reaction and its practical application.....	735
--	-----



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